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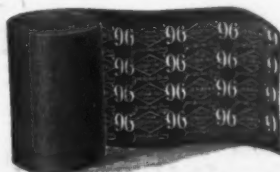
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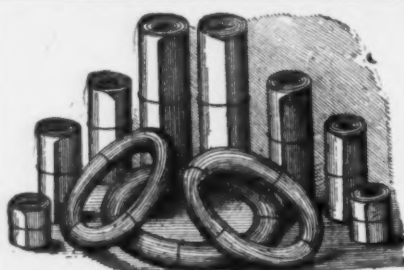
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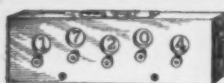
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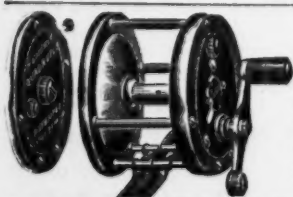
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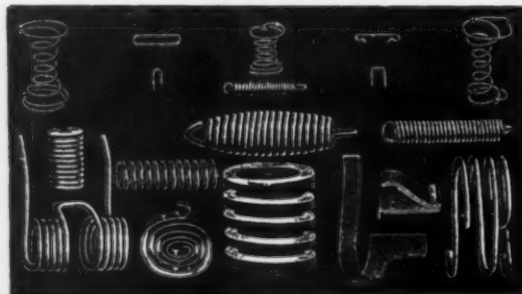
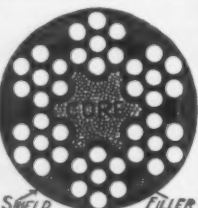
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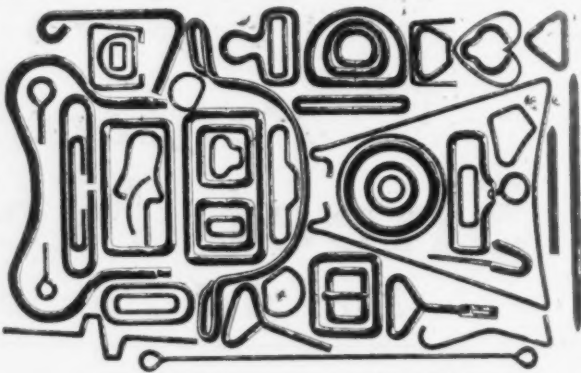
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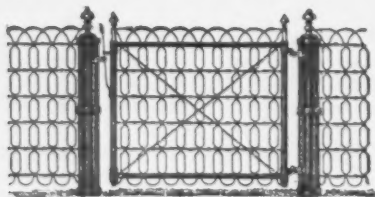
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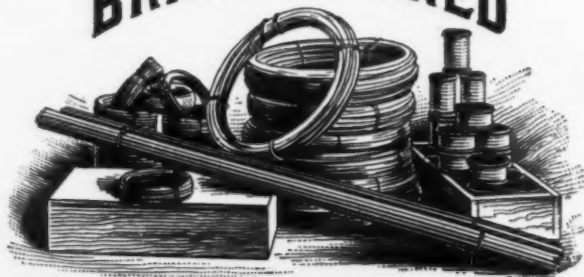
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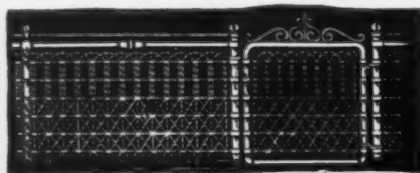
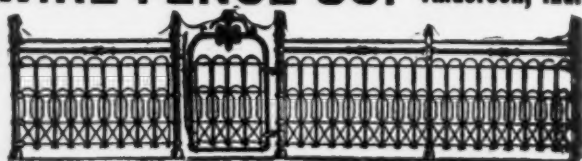
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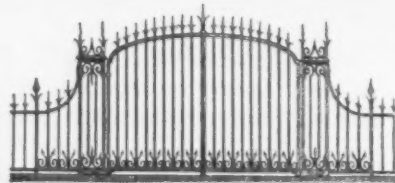
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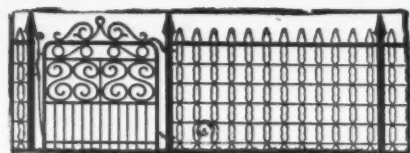
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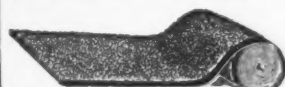
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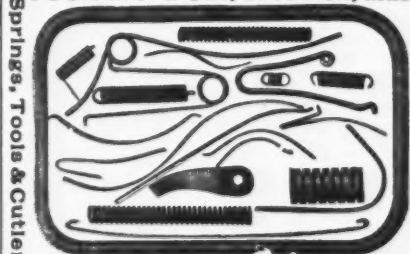
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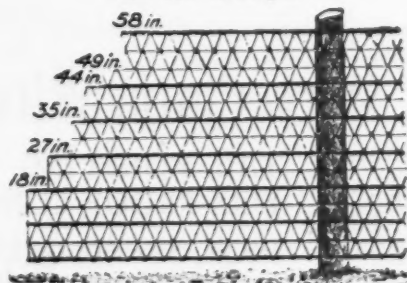
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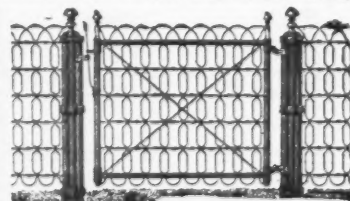
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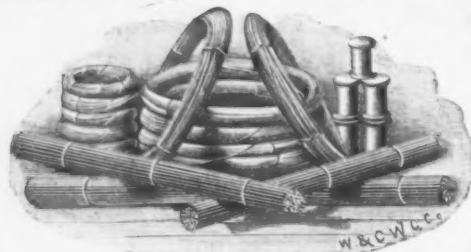
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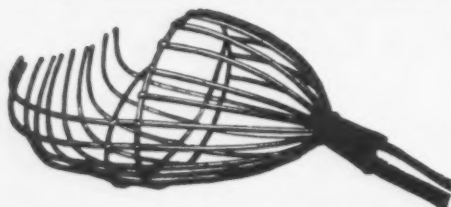
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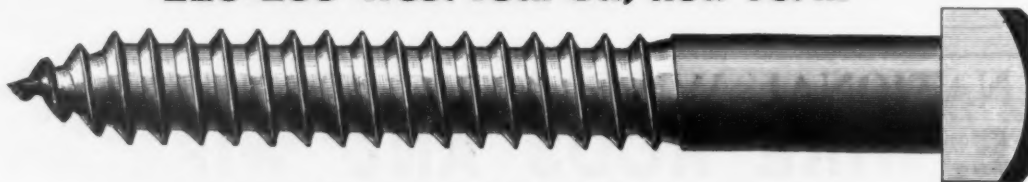
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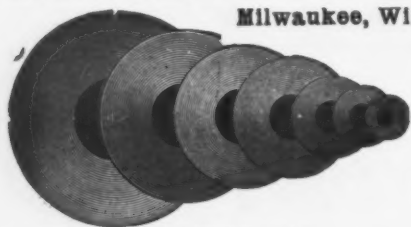
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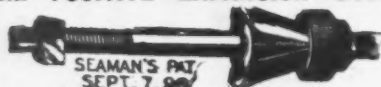
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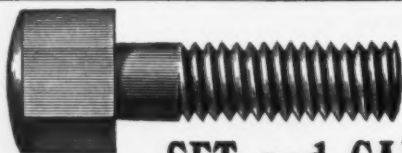


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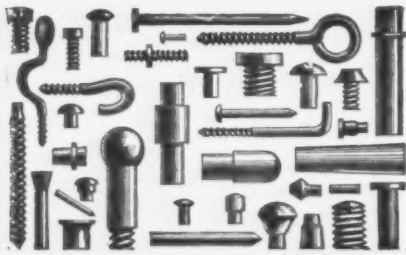
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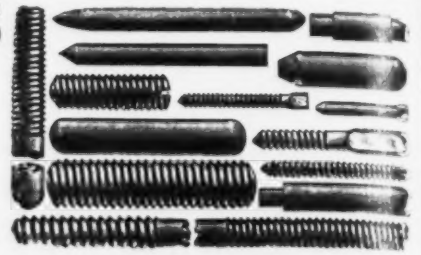


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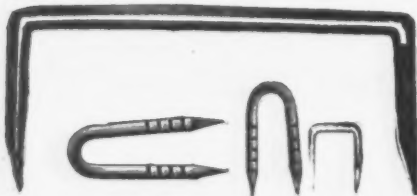
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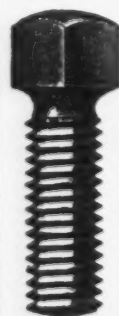
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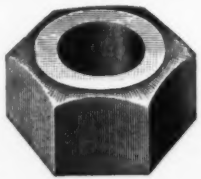
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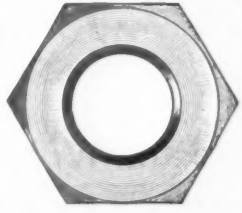
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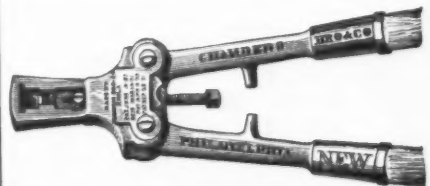
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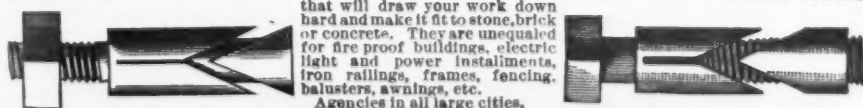


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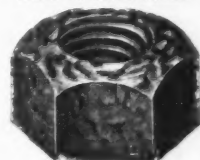
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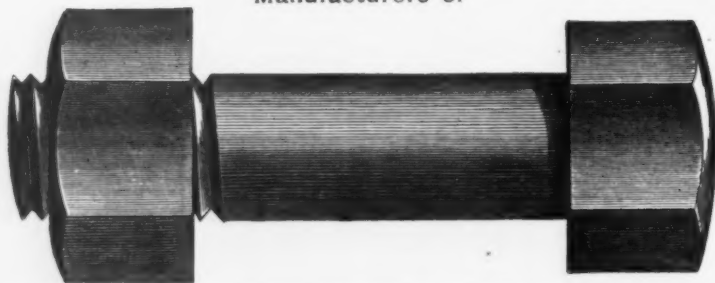
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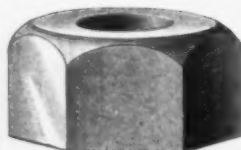
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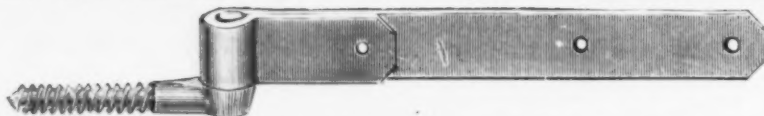
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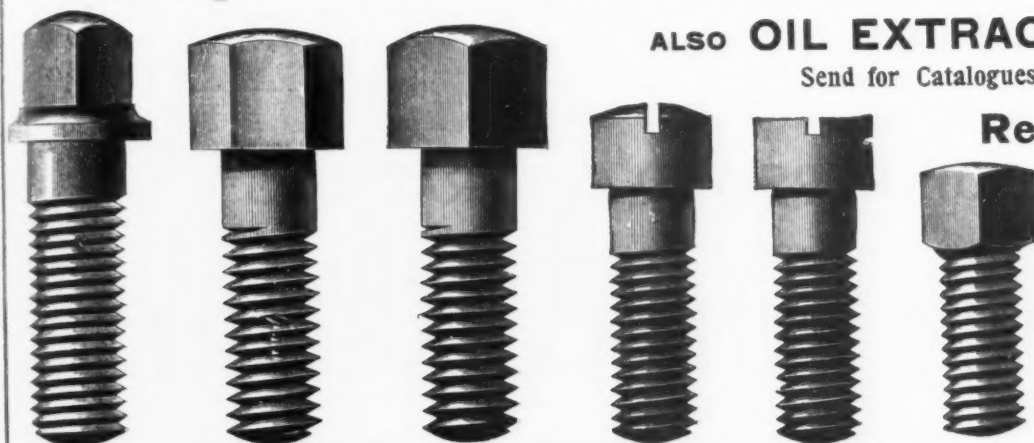
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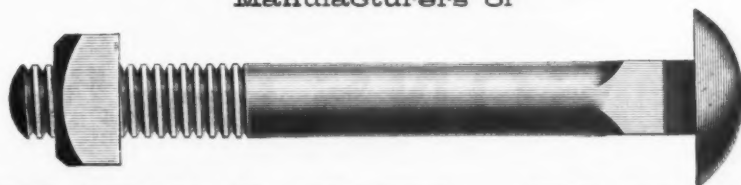
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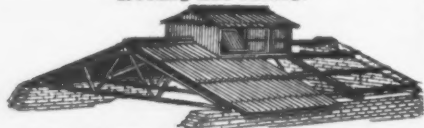
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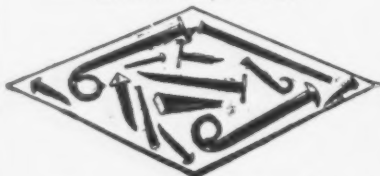
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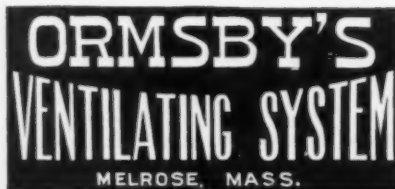
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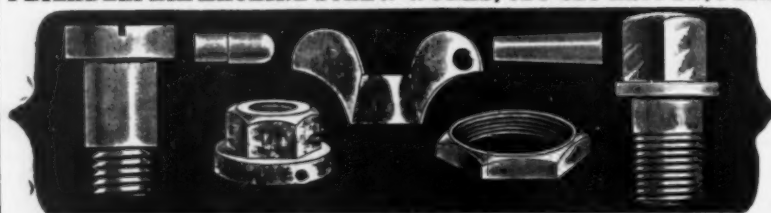
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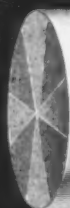
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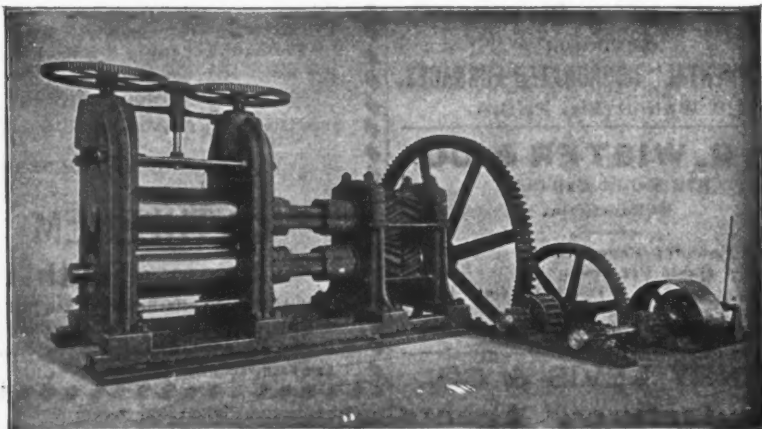
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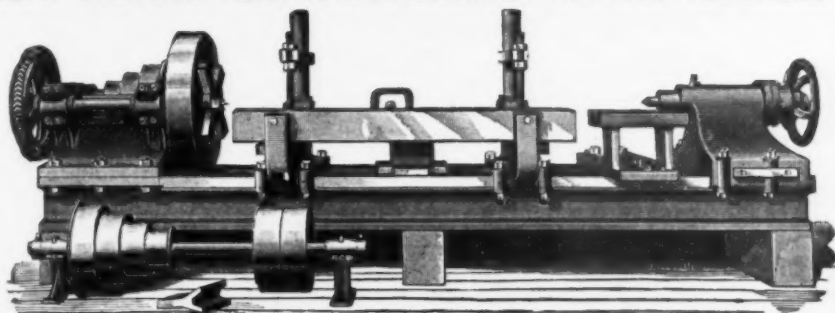
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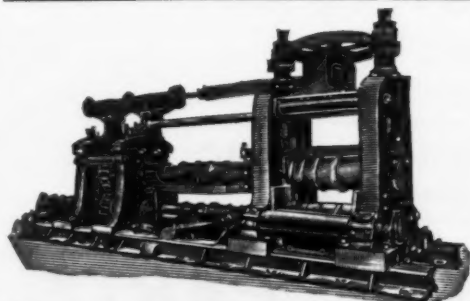
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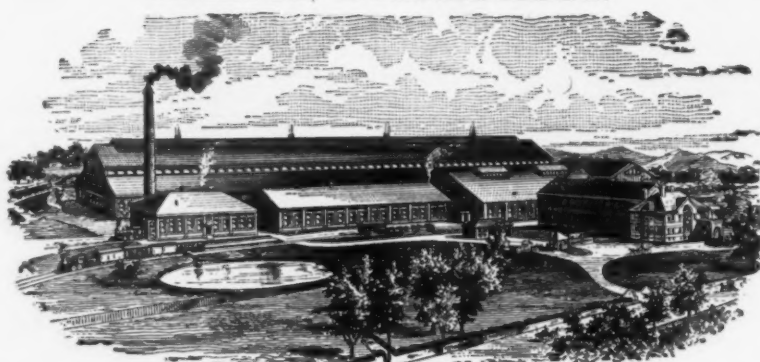
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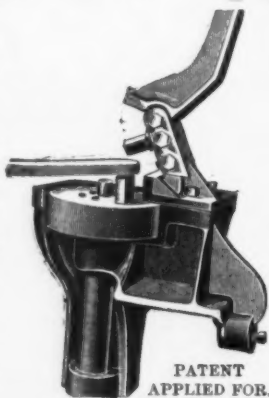
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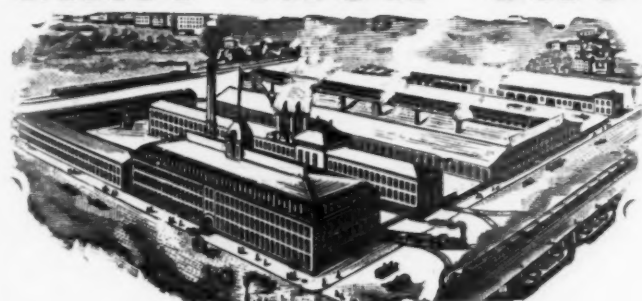
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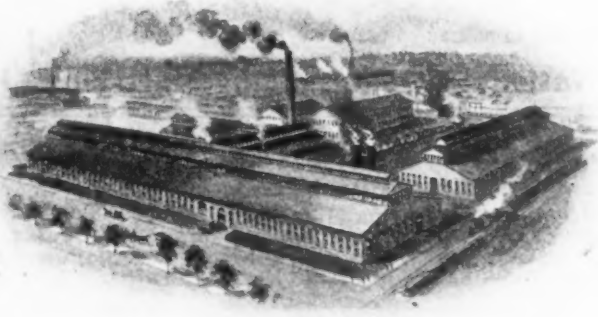
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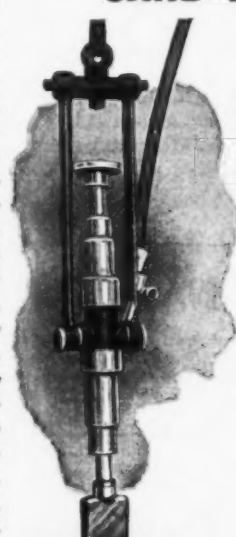
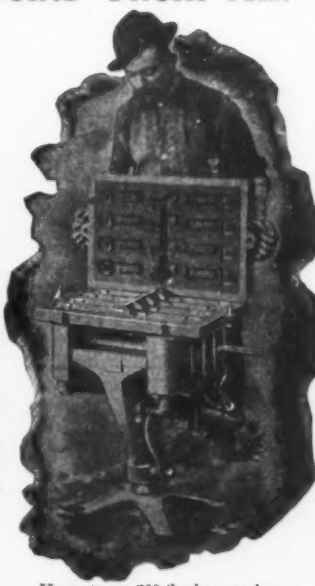
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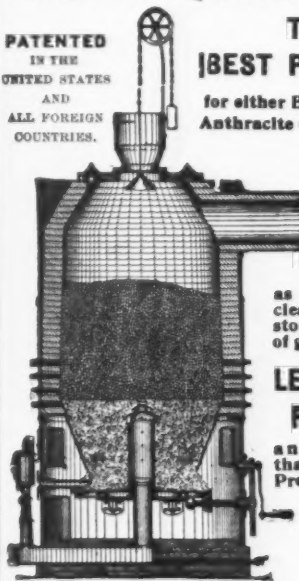
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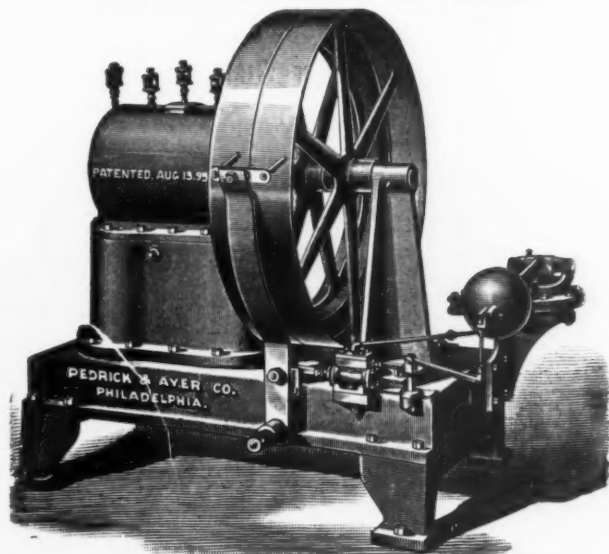
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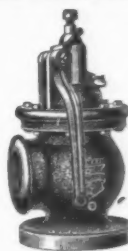
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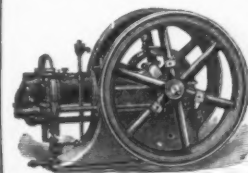
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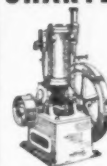


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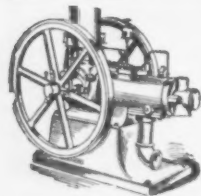
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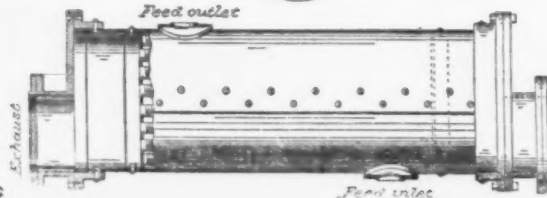
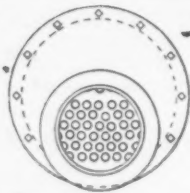
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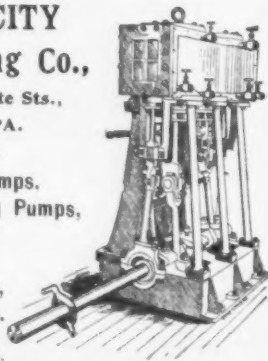
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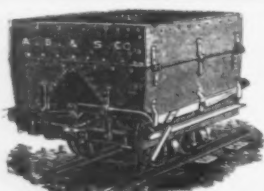
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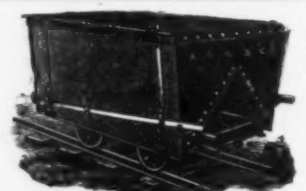
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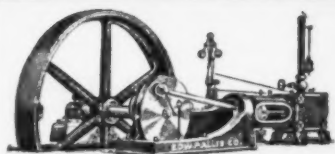
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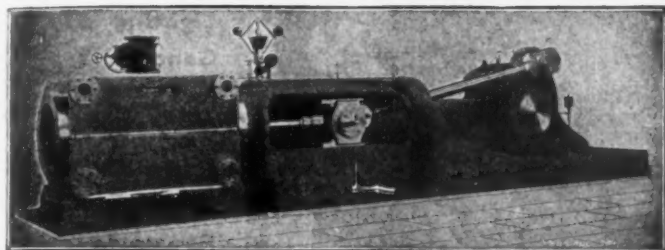
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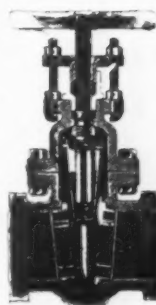
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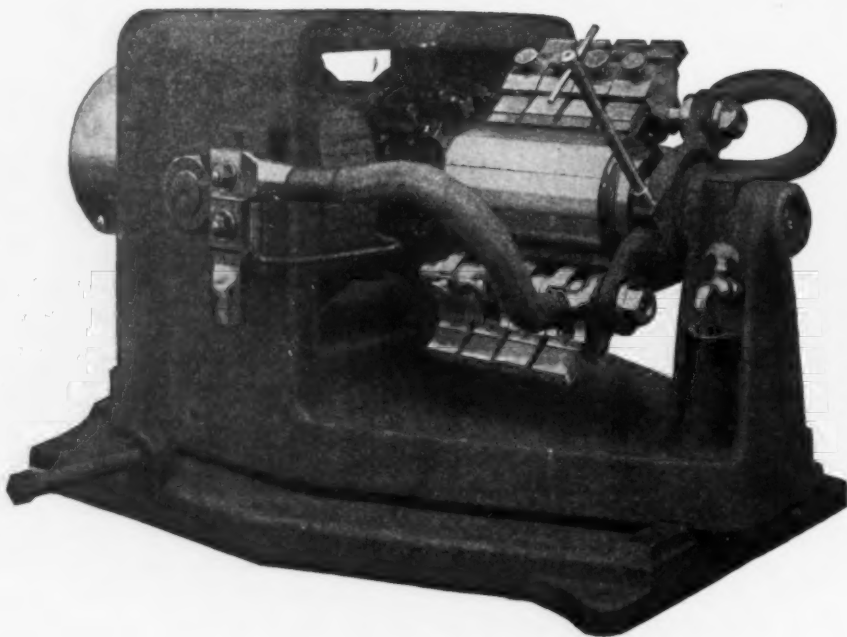


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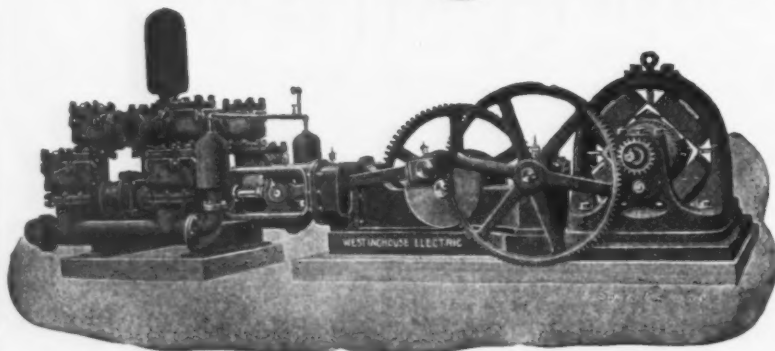
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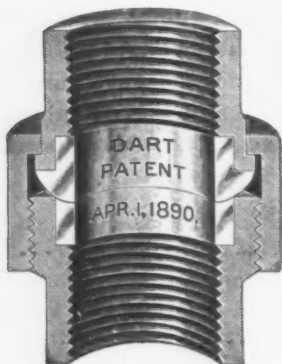
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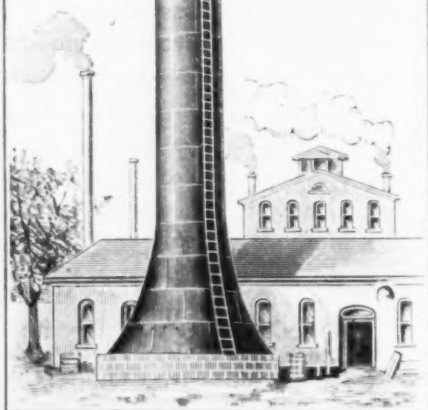
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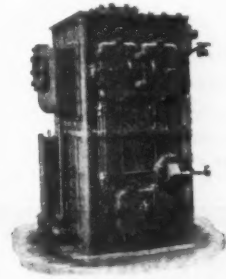
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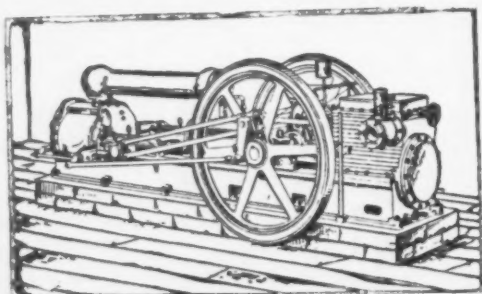
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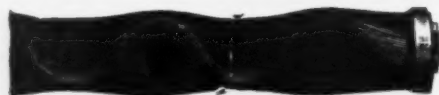
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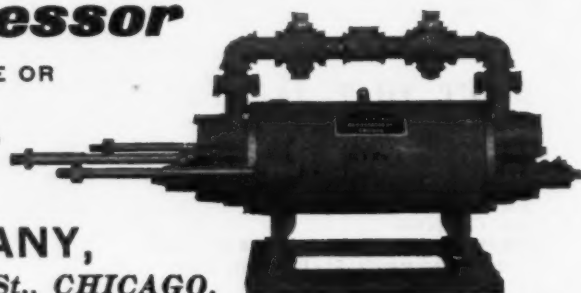
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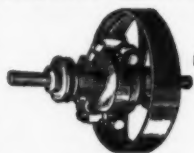
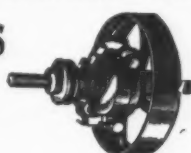
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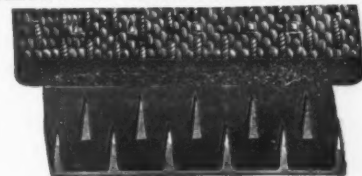
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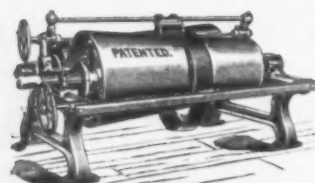
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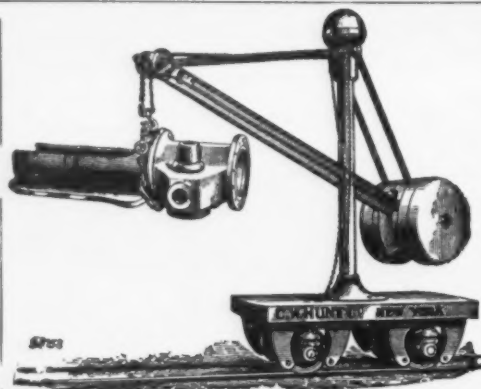
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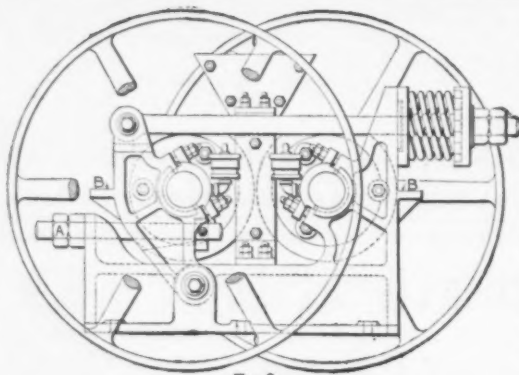


Fig. 2

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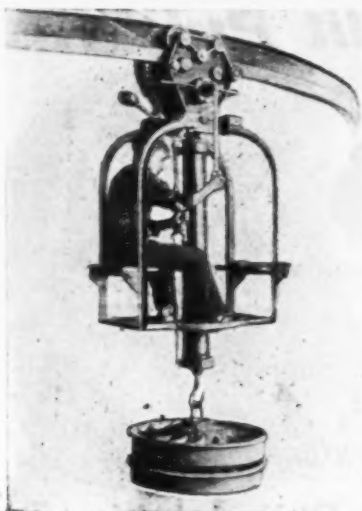
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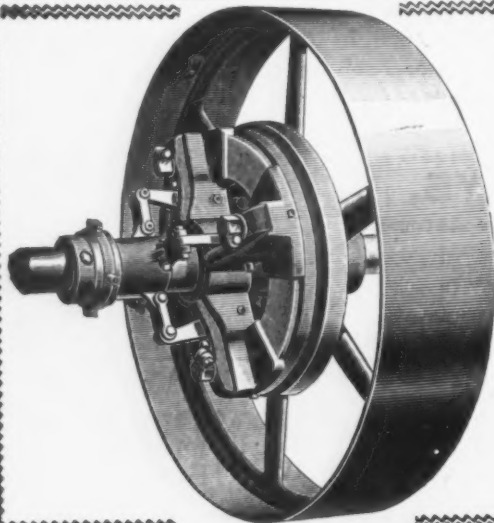
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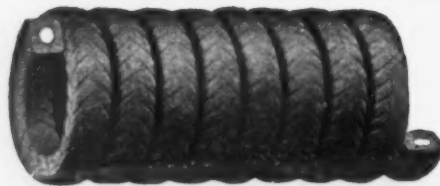
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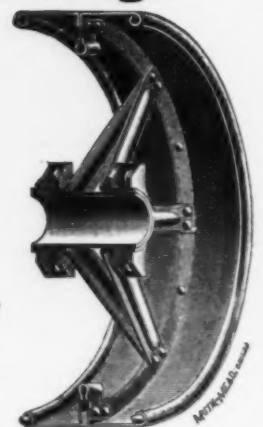
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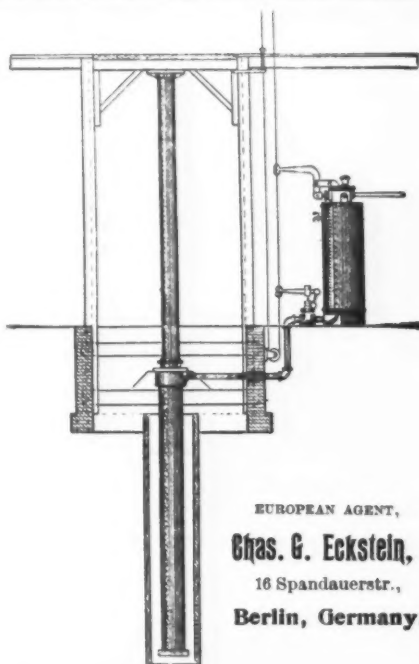
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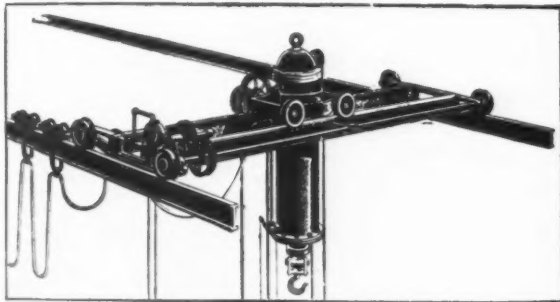
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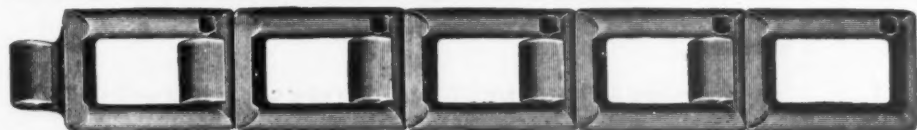
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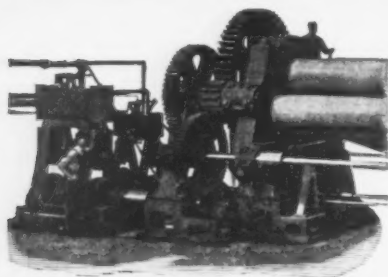
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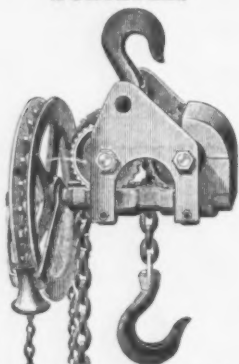
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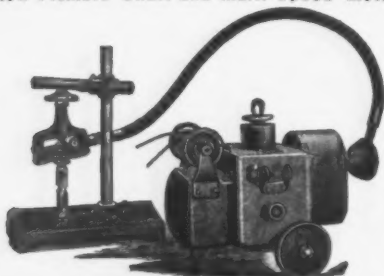
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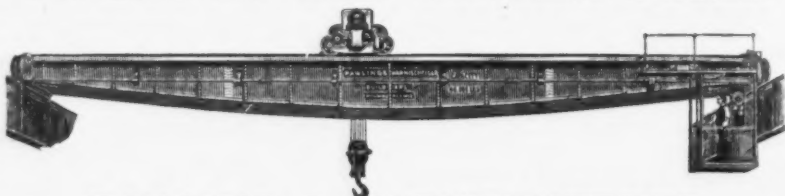
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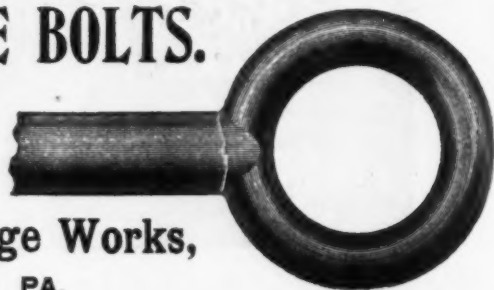
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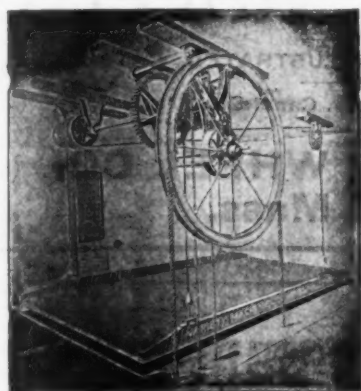
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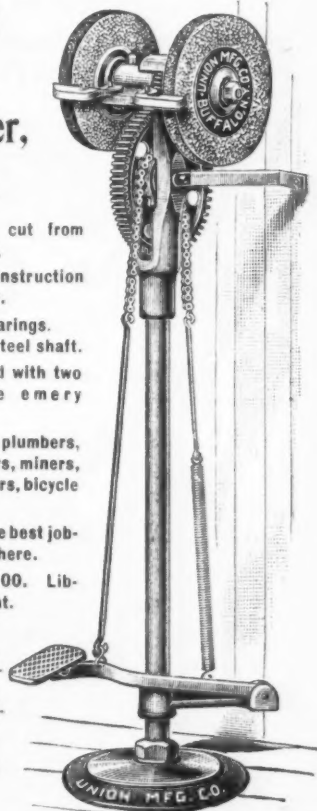


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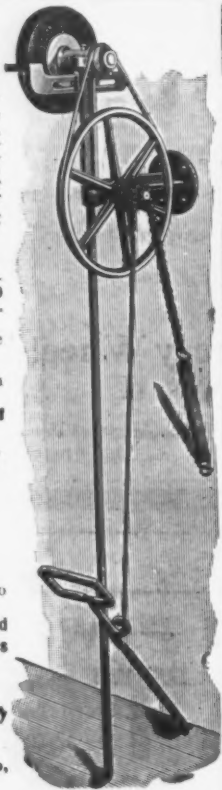
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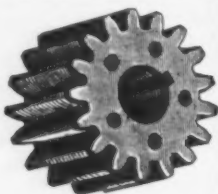
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are more carefully made and graded better than other emery wheels. They will do finer work and more of it; and they are far safer to use. These are a few of their good points. There are others. Our catalogue tells about them. Send for it.

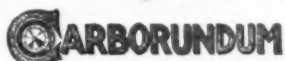


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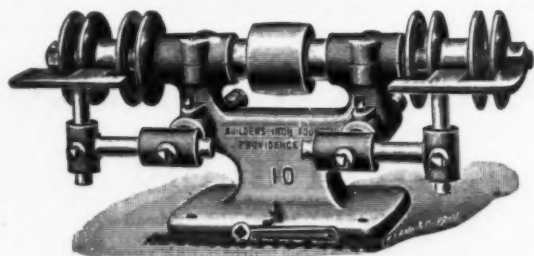
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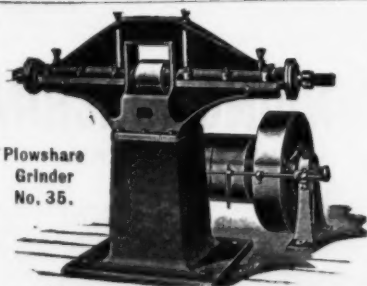
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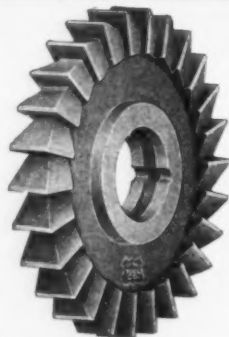
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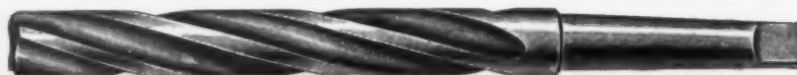


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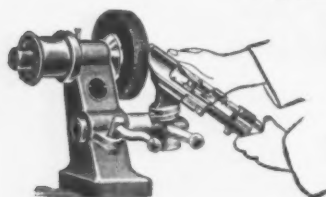
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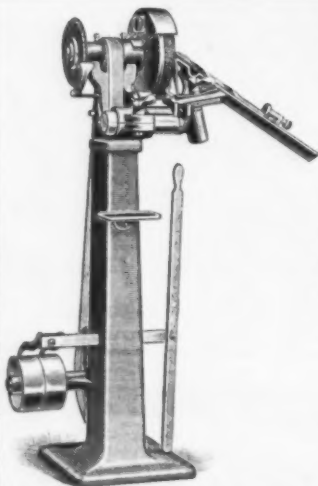
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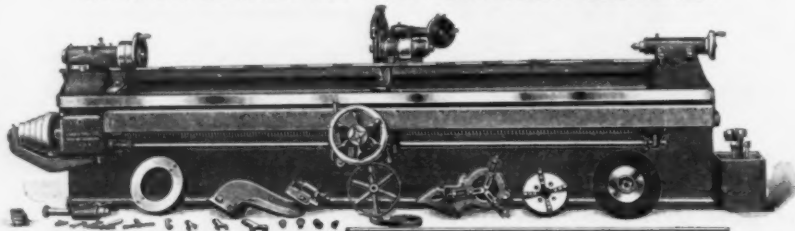
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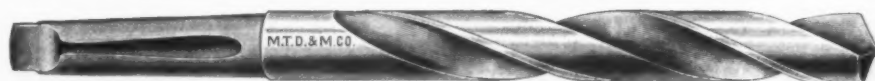
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The accompanying cuts represent the style of socket and shank of drill used in this socket. The drills are held in place by the key in the socket. As the groove extends the entire length of the shank there is no difficulty in placing the shank in the proper position.

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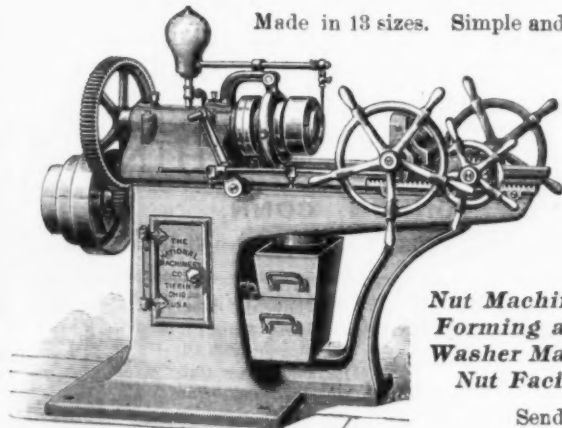
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Bolt Cutters,
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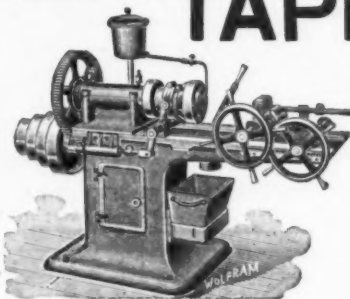


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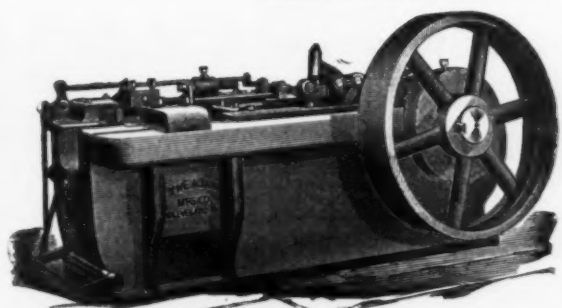


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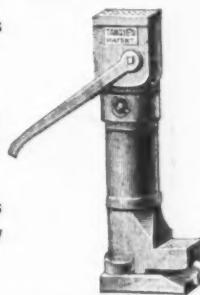
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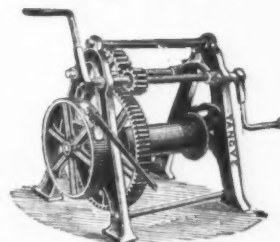
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The key lowers
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Superior shafts
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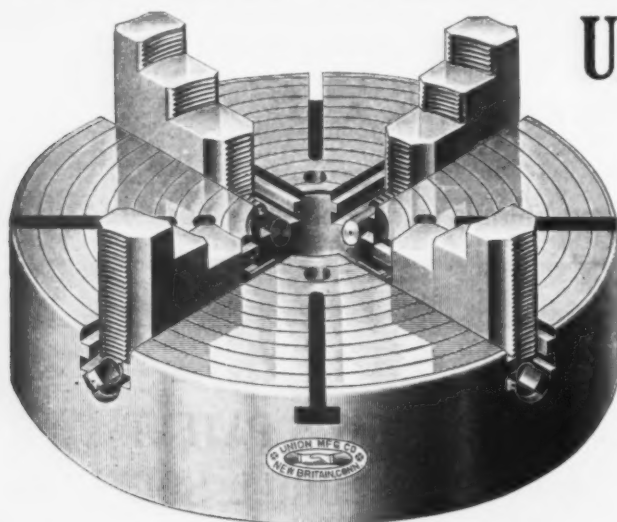
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A well made chuck of great strength, "T" slot commencing with 10 in. size and up.

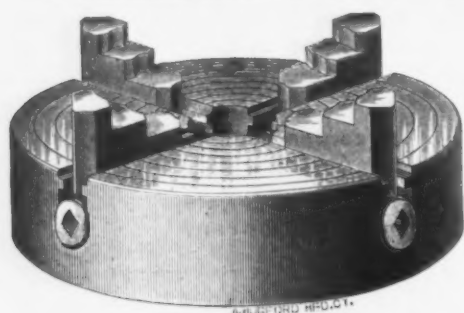
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New Adjustable Round Die.



"Cushman" Chucks.

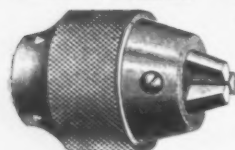
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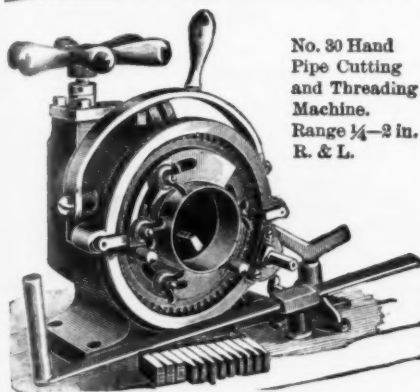
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Machine.
Range $\frac{1}{4}$ —2 in.
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THE Curtis & Curtis Co.

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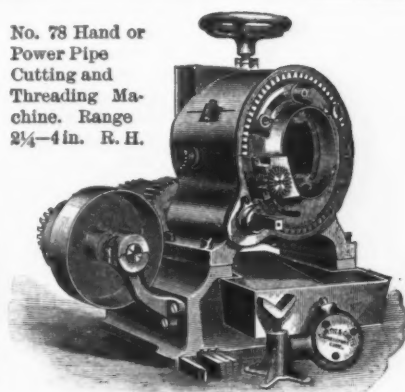
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Cutting and
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has led the procession, and served as a model and standard of comparison for nearly

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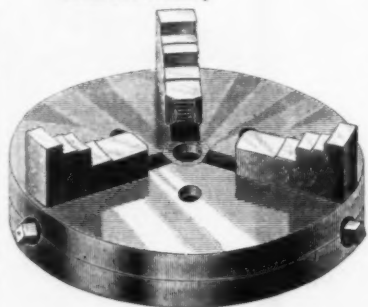
In order to do this it must possess

MERIT.

The Horton Chuck Co.,

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ITS ONLY PURPOSE TO HOLD DRILLS SO
IT IS IMPOSSIBLE FOR THEM TO SLIP

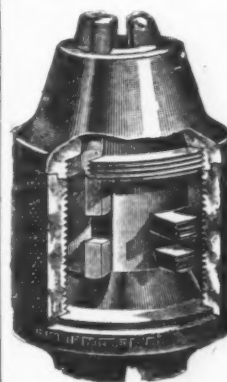
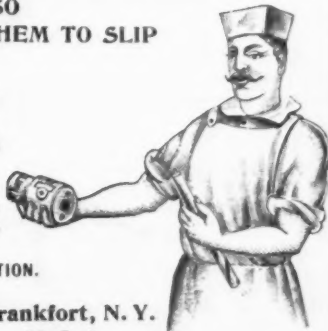
is the object of the

PRATT CHUCK

How well it has qualified is borne out by every user. Its construction is such that a little dog floats on top of the jaws, holding the flat end of the drill so the drill cannot slip.

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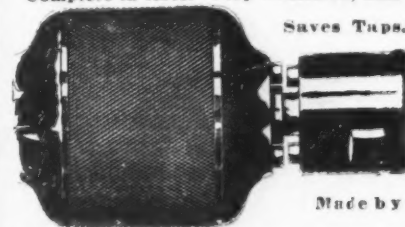
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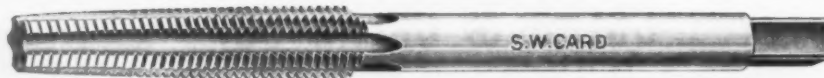
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For use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain.

Can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light, which is ten times greater than the light of an ordinary gas burner.

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2**
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are found in the company of mixed dogs. Our Dogs take care of the "metal hogging" operations and never flinch. The other dogs hang around for a while and then they go—they break. Then more of our Dogs come along and they stay.

See Red Book "F" (on Williams Drop-forgings) describing Straight and Bent Tail kinds.

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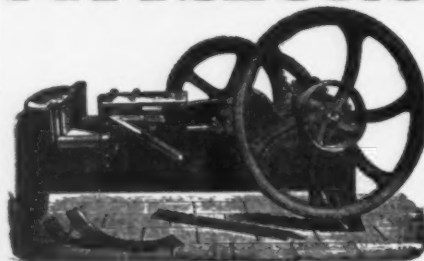
BUILDERS OF

**Grosgrrove's Patent Straightening,
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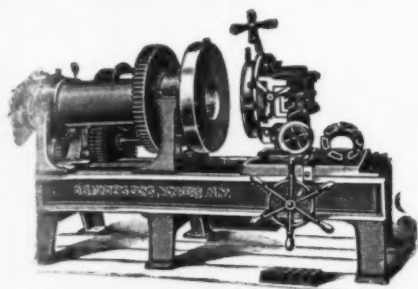
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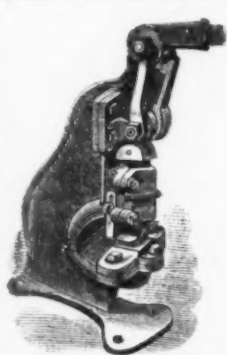
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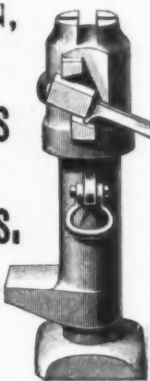
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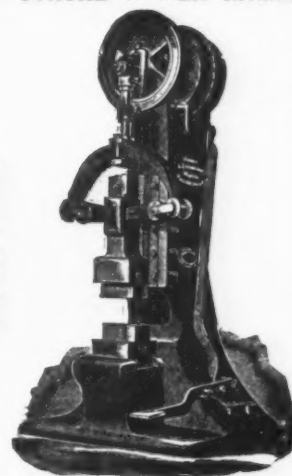


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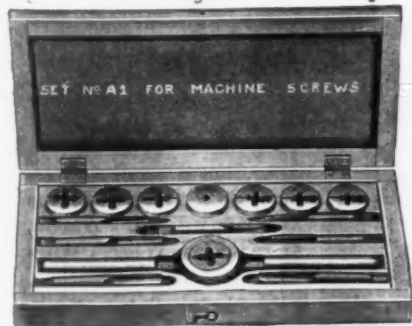
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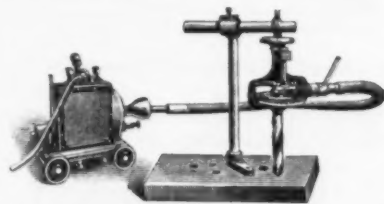
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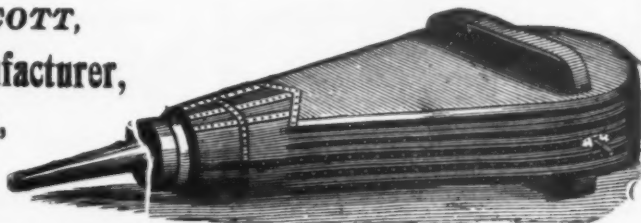
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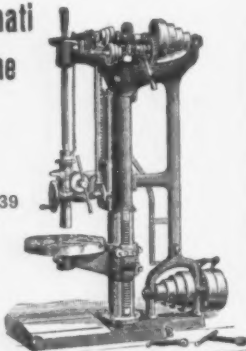
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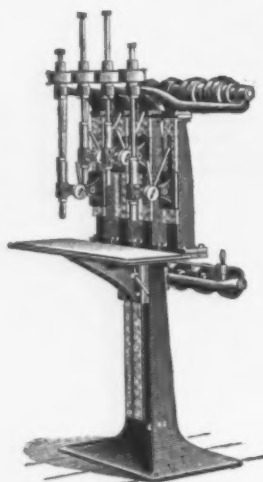
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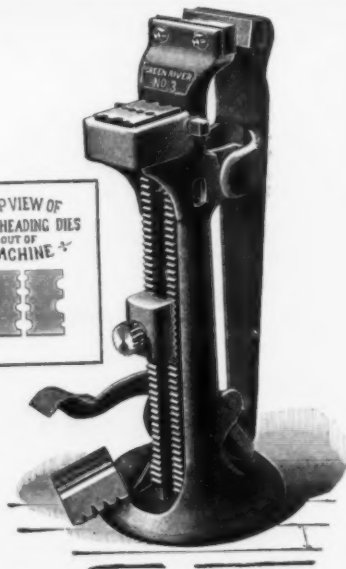
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Complete for Shoeing and Bolt-heading. \$12.50
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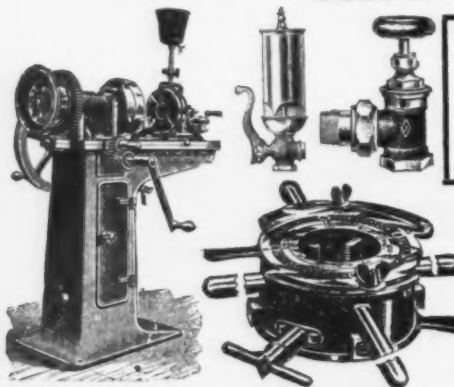
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BOLT-HEADING DIES
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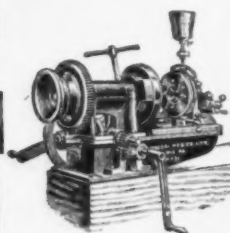
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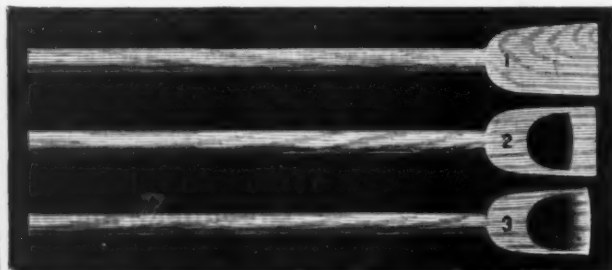
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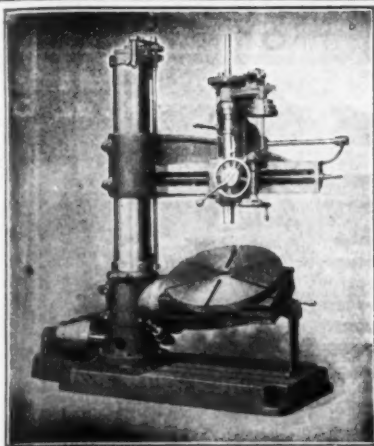
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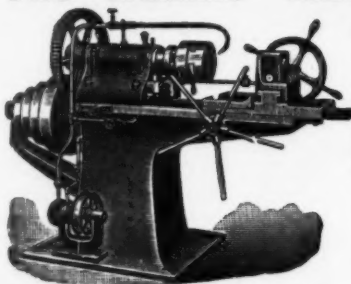
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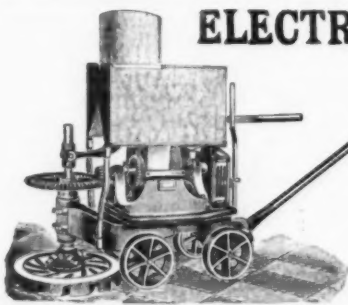
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Power Post Drill,

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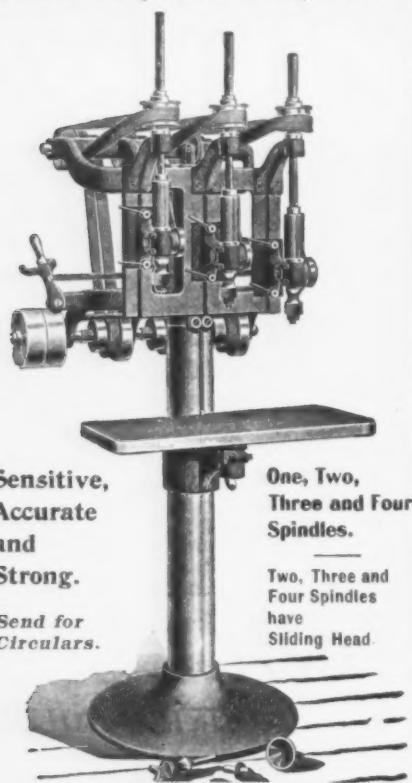
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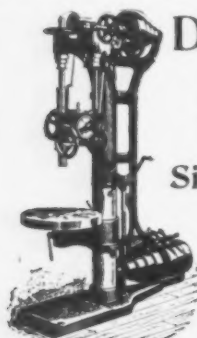
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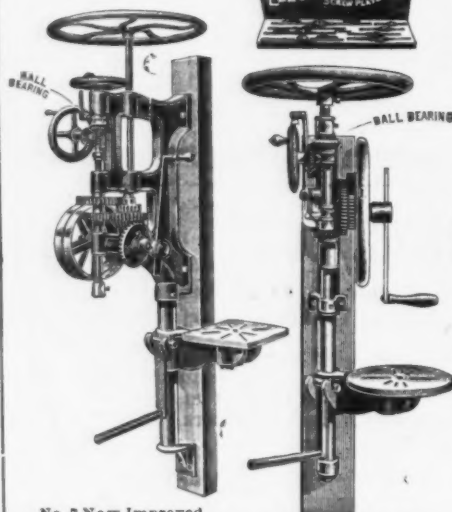
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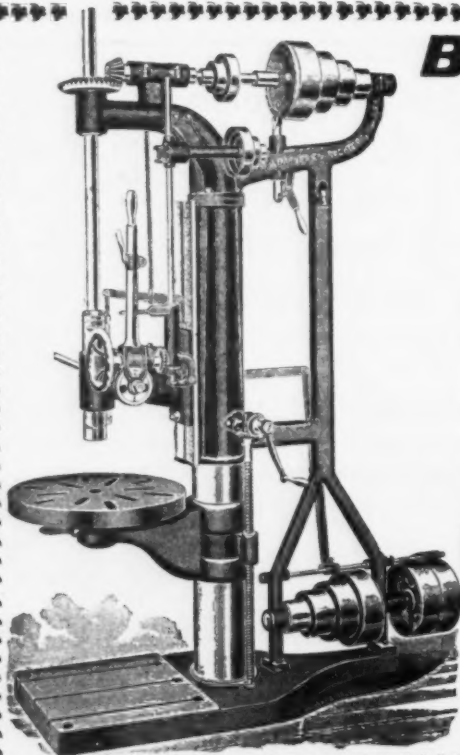
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Upright
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8 IN. TO 42 IN. SWING.



This cut represents our new 28 in.
Sliding Head Drill with back gear,
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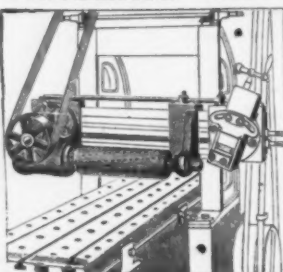
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Swivels from
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surfaces that
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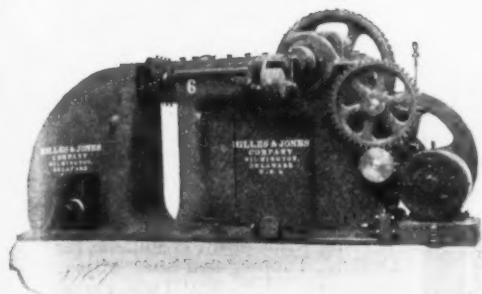
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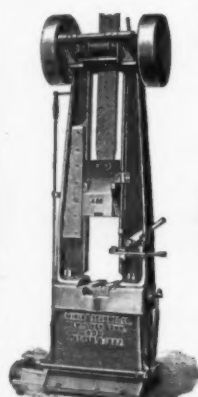
Heavy Horizontal Punches.



The accompanying cut illustrates a horizontal punch with 60 inches depth of throat, capacity equal to punching 10 x 16 manholes through $\frac{3}{4}$ -inch plate. Machine is also designed for heavy rivet-hole punching, up to $1\frac{5}{8}$ in. diameter through $1\frac{1}{2}$ in. plate.

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HAND AND POWER DROPS FOR
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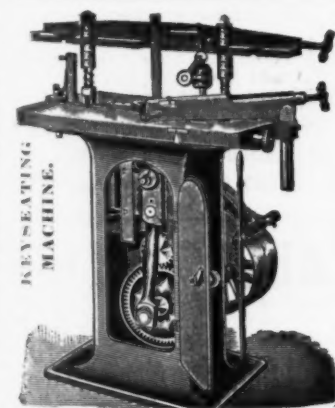
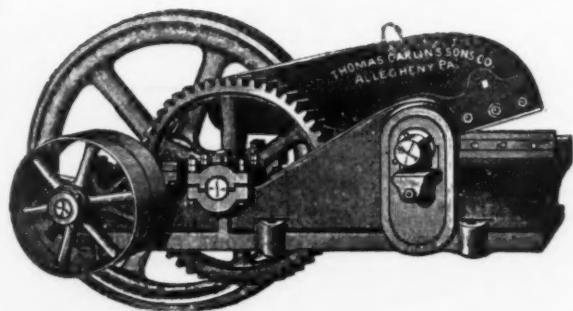


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From 10 to 30 inch swing.

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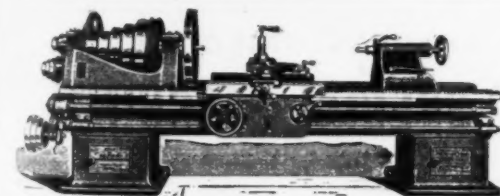
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Heavy Turret Lathes, 16 in., 18 in.
& 28 in. Radial Drills, 4 ft. arm.

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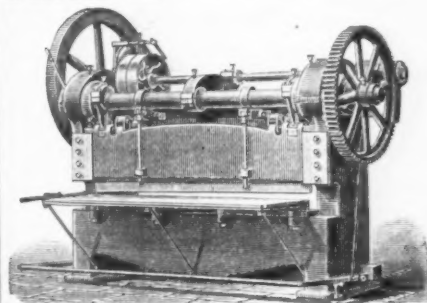
possess *all* the good features
other hammers have and *many*
good features other hammers
haven't.

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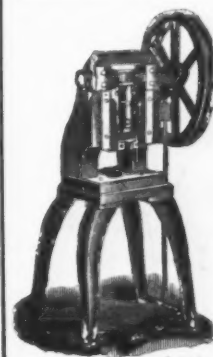
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86 inches wide between the housing,
with 6-inch throat depth, having capacity
to cut off a $\frac{3}{8}$ inch plate—the full width
of the machine.



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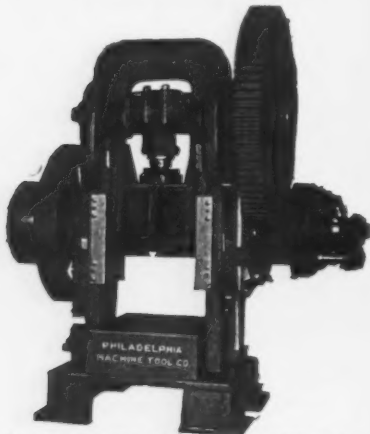
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Simplest, Best Design.
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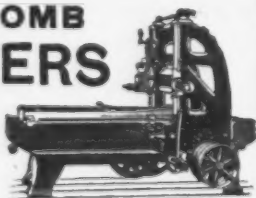
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PLANERS**

Send for Price.

**WHITCOMB
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60 Hours to 3 Hours

represents the difference in time between tapping holes by hand and using a "Star" Tapping Attachment on a small job by one of our recent customers. A larger job would show even a greater difference—You are not obliged to use the "Star" Tapping Attachment every hour to make it pay. The "Star" Tapping Attachment is suitable for Drilling, Tapping and Stud Setting. Automatic. Fits any Drill Press. No Reverse Belts required. Friction and Positive Drive. Chuck securely holds any drill, tap, etc.

**No. 1 Taps 1-16 to 5-8 inch.
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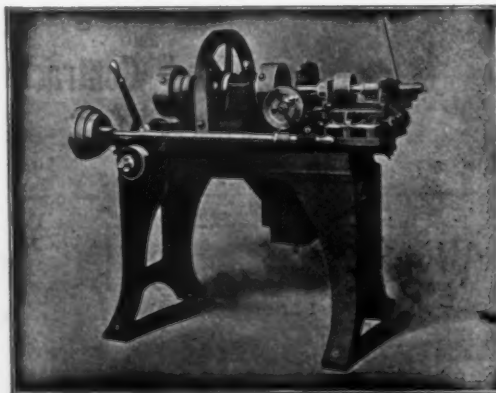
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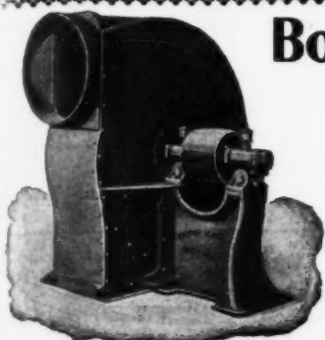
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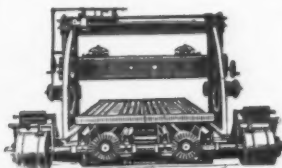
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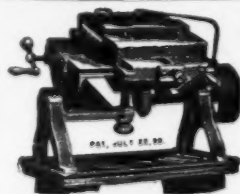


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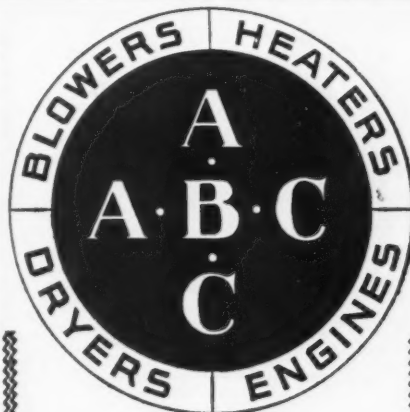
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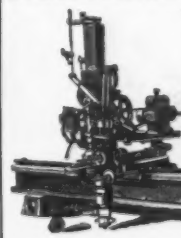
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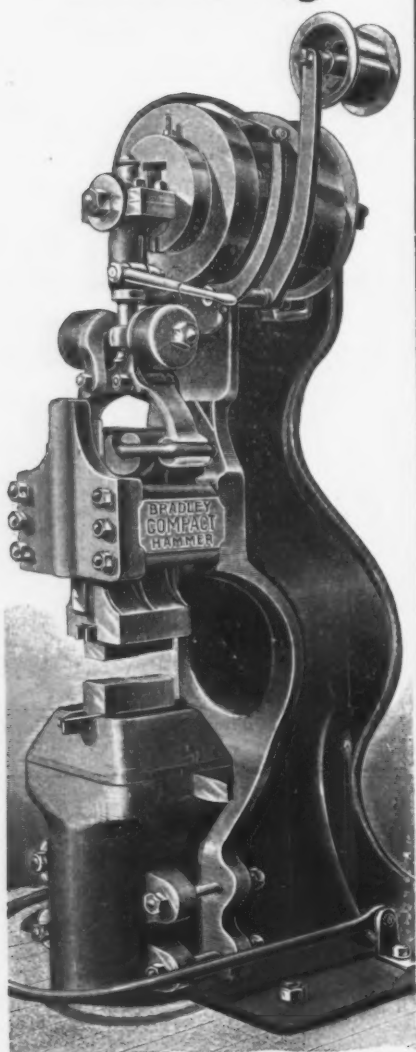
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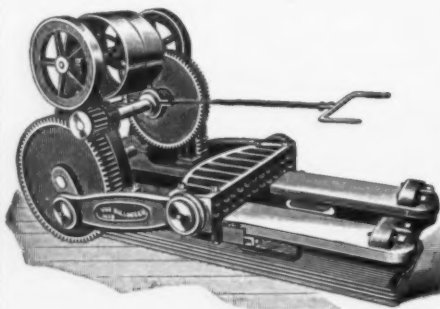


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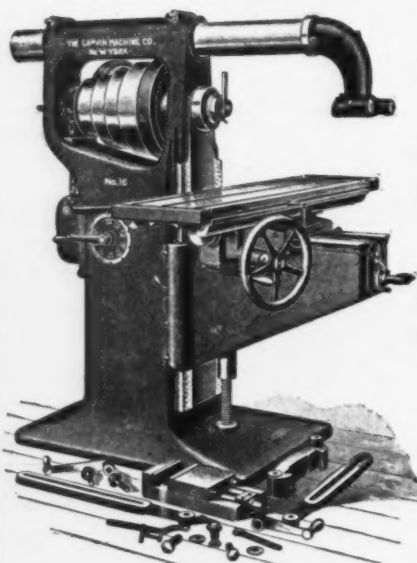


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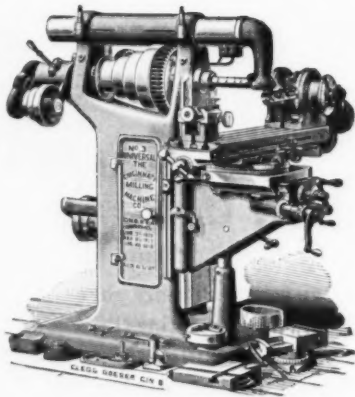
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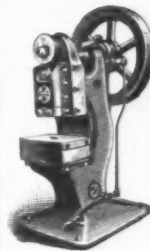


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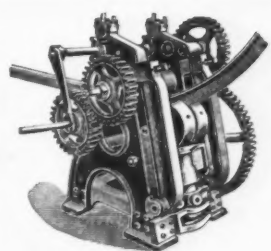


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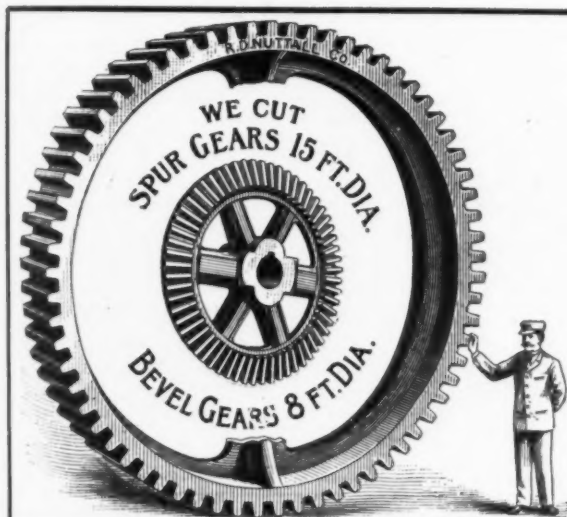
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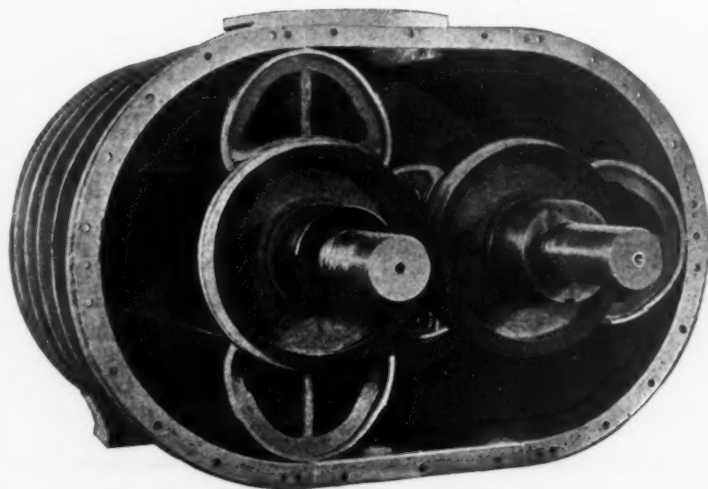


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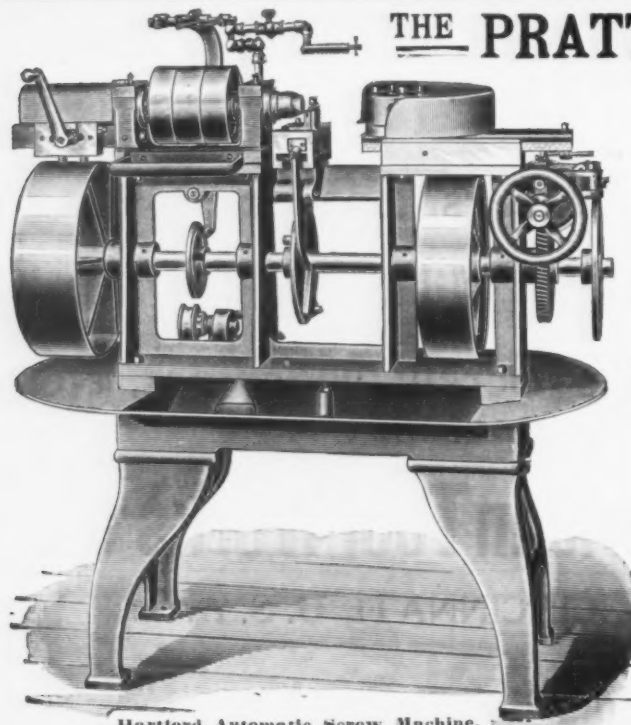
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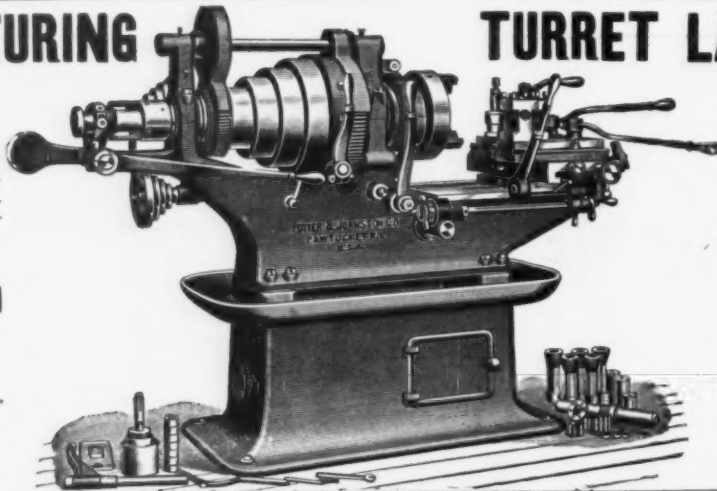
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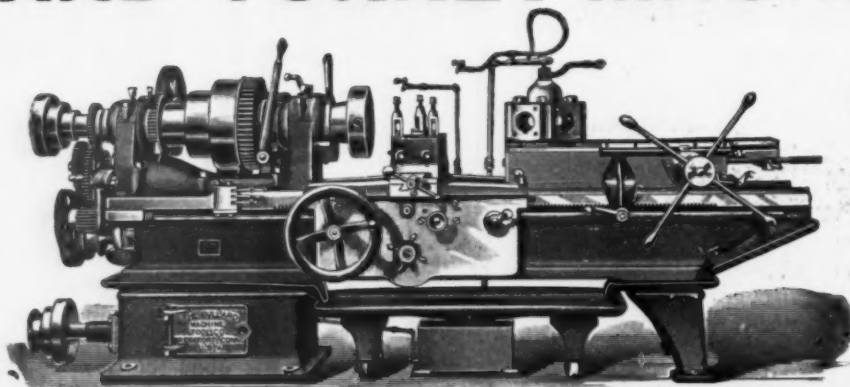
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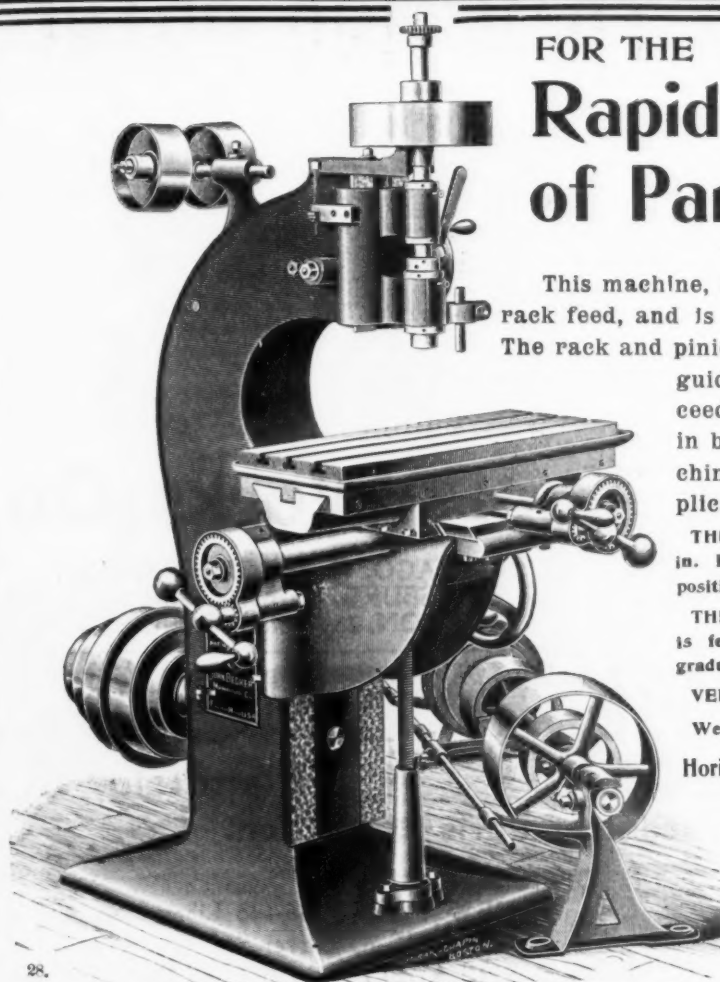
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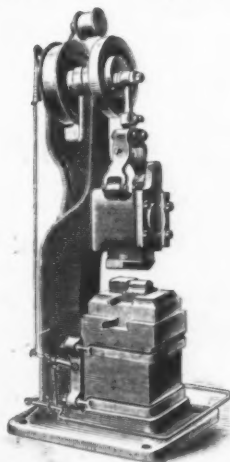
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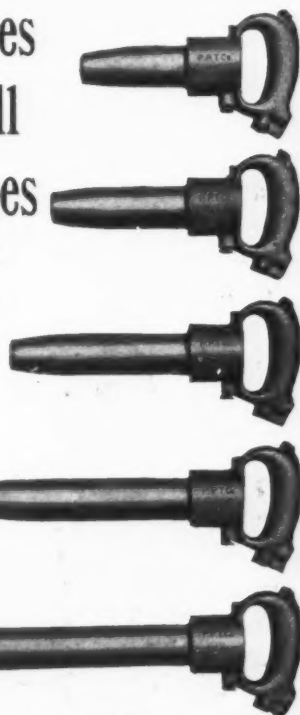
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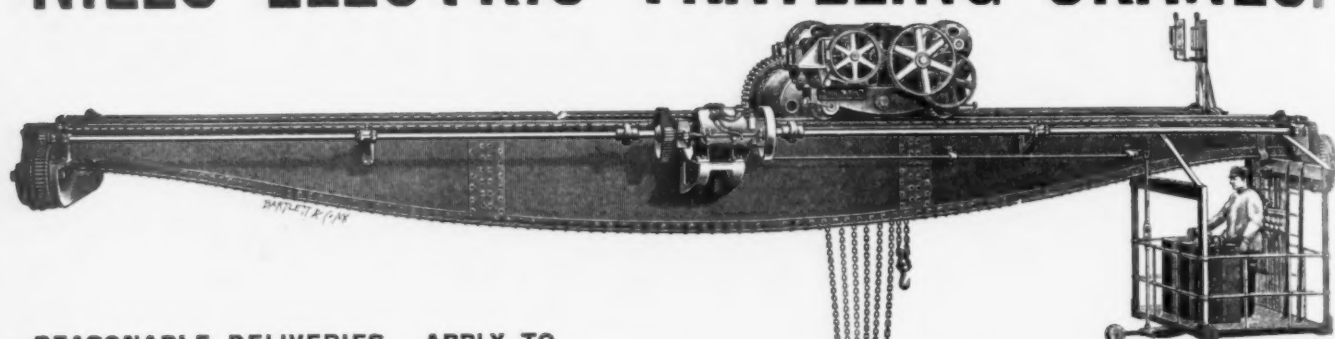
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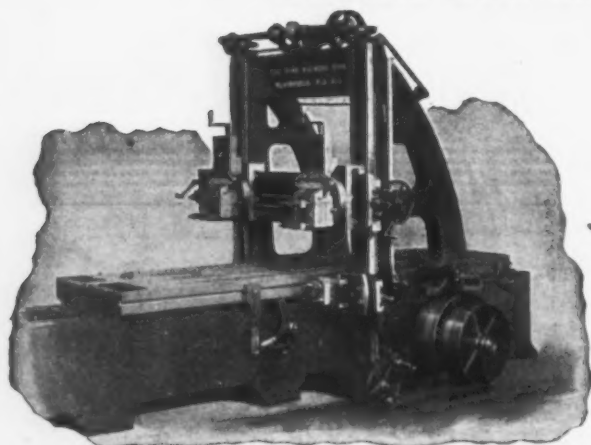
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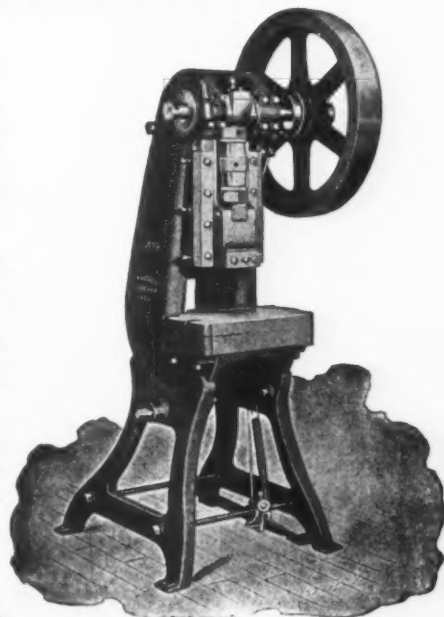
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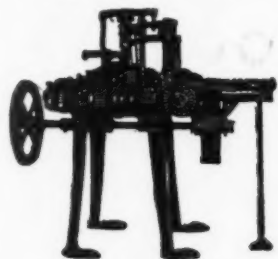
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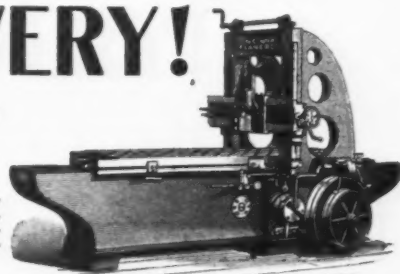
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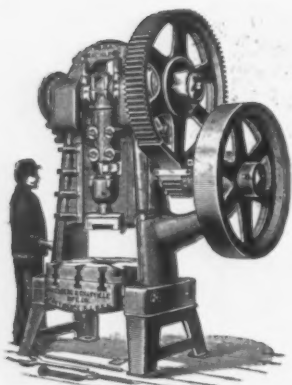


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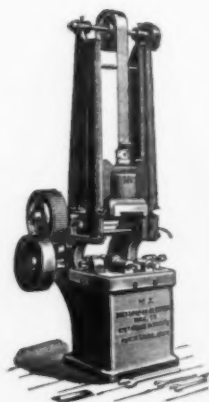
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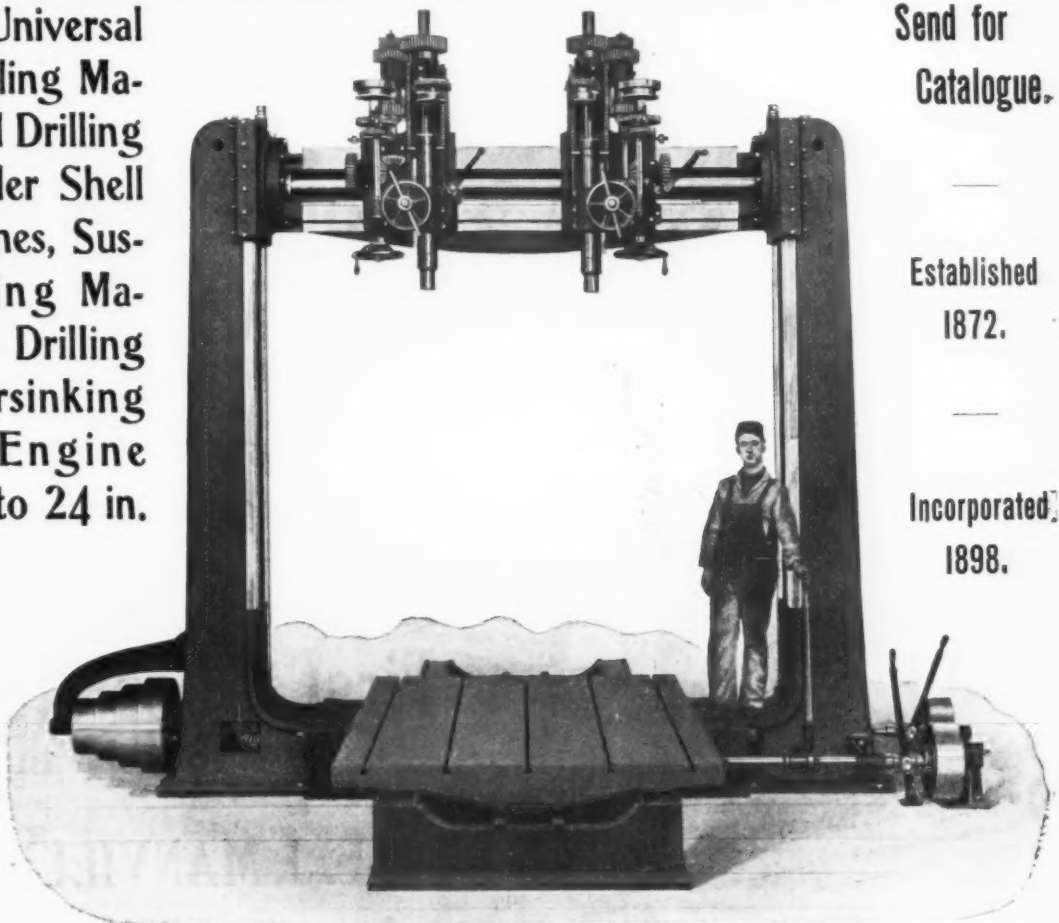
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**Highest Award,
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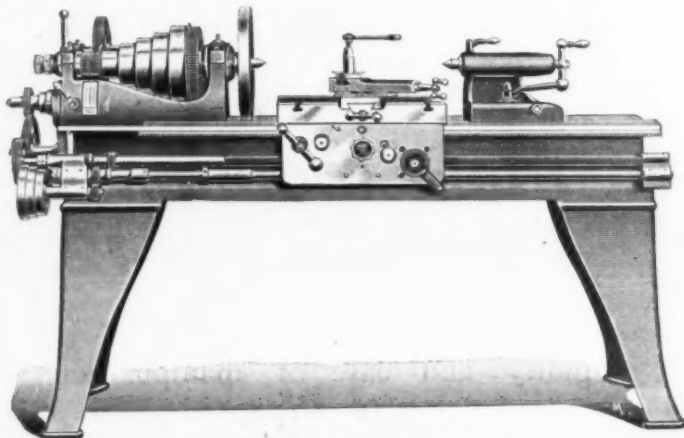
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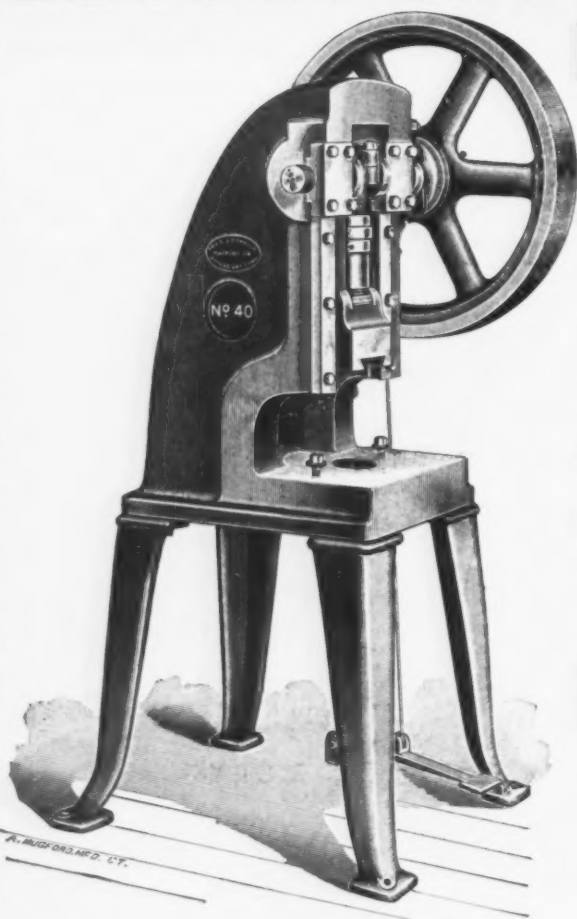
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**Strong, well built and up-to-date in every
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THE cut shows our 20 in. Drill, which we guarantee to drill up to **one inch in steel**
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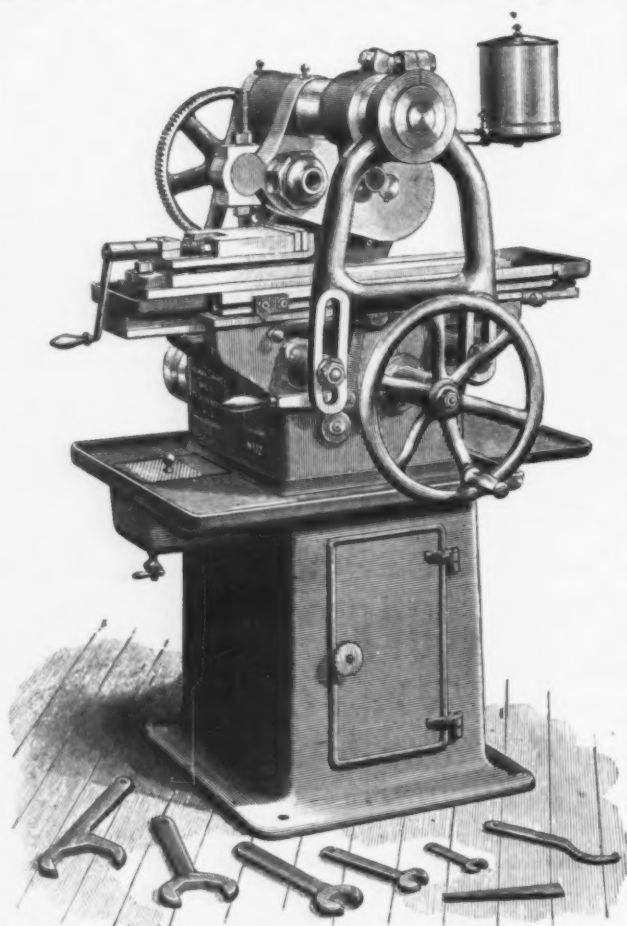
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This machine, by reason of its
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36 in. x 20 ft. Triple geared Screw feed, spindle 10 in., wt. 30,000 lbs.
50 in. Pulley Lathe, Two Tools, Niles.
32 in. x 14 ft., Townsend.
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40 in. Swing, Single Head, Standard.
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Hyd. Riveter, 96 in. reach, Bement.

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36 in. x 16 ft.
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"Kempsmith" Millers.

Universal, all sizes.
Plain Automatic, all sizes.

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1 pair 28 in. x 60 in. Harris-Corliss engines.
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22 in. x 42 in. Harris-Corliss engine.
22 in. x 42 in. Wright four valve auto. engine.
20 in. x 42 in. Harris-Corliss engine.
20 in. x 40 in. Putnam four valve auto. engine.
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2 75 tons Wetherill-Corliss ice machines.
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1 1/2 in. National Bolt Cutter.
25 lb. Justice Hammer.
No. 1 Slate's Milling Machine.

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1 Woodward & Rogers 2 Spindle Drill.
1 Woodward & Rogers 4 Spindle Drill.
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And many others.

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2 600 lbs. Merrill Drop.
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212 in. x 5 ft. B. G. Speed.
111 in. x 4 ft.
122 in. x 9 ft.

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140 lb. Bench Drop.

Large stock new machines. Prices on application.

Two 20-ton Hand Traveling Cranes, 58 ft. 10 in. span.

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136-138 LIBERTY STREET, NEW YORK CITY.

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12 Plain Vertical Engines, 3 to 50 H. P.
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Direct Connected Engines, 3 to 300 H. P.
Simplicity, strength and highest efficiency.
Hoisting Engines, 5 to 100 H. P., single and double cylinders and drums.
Full line Machine Tools and Wood Working Machinery.
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One 18 x 48 Wheelock Corliss Engine, complete, \$1,000.
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Eight 60 x 16 Horizontal Steel Tubular Boilers, complete, a bargain.
12 x 36 Lane & Bodley refitted Corliss Engine at \$750.
Three 11 x 18 celebrated Straight Line Automatic Engines, complete, at a bargain.

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1 P. & W. Cutter Grinder.

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19 in. Trav. Hd. Sellers.
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2 10 in. stroke Bement.

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154 in. x 8 ft. Pond Horizontal Boring Mill, triple geared.
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154 in. Hydraulic Press, complete with pump.

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2 Fairbanks, 110,000 lbs. capacity.
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2 Screens 68 in. x 11 ft. 6 in. with countershaft and friction clutches.

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114 in. and 24 in. x 14 in. x 18 in. Worthington Comp'd Condensing Duplex.
18 in. x 5 in. x 13 in. Cameron.
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50 lb. Dlenelt "Dead Stroke" Hammer.
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27 in. x 8 ft. Fitchburg Planer.
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No. 51 " " "
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1 Second hand Corliss Engine, 14 in. x 42 in.
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One 66 x 16 Tubular Boiler, 64 in. tubes, brand new breeching and stack 32 in. x 60 ft. Allowed 100 lbs. pressure.

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Two 44 x 16 Boilers, thirty 4 in. flues, new fronts, all fixtures and trimmings. Allowed 100 pounds pressure.

One 1200 H.-P. Berryman Feed Water Heater. Used two months. Built 1898.

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One right hand Wetherill Corliss Engine, cylinder 28 x 60; flywheel 20 feet diameter, weight 30 tons; shaft 15 in. x 12 ft. 6 in.; rope drive pulley 18 ft. diameter and grooved for 15 2-inch ropes; driven wheel 78 in. diameter grooved for 13 2-inch ropes; two iron idlers with boxes complete. With or without Independent Condenser 10x14x16.

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Two ten stamp belt-driven Atmospheric Stamps.
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One Garvin No. 2 Hand Milling Machine.
One (each) No. 8, No. 2 and No. 4 Dallett Portable Mill Presses.
25 to 300 H.-P. Slide Valve Engines.
One New Compound Duplex Direct Acting Steam Pump, a million capacity.
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Blooming Mill Engines For Sale.

A pair of Reversing Engines, 28 x 48, with countershaft and extra heavy gear wheels in Steel, all set in massive box b d plates; built by Mackintosh, Hemphill & Company, and used about four years; bloomed six hundred tons of four inch billets per day from 16 in. x 18 in. ingots. Well adapted for an open hearth plant; are in good condition. Apply to

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Wanted to Make

We have a complete modern manufacturing plant near Boston, equipped with **Power Presses, Automatic Screw Machines, Nickel Plating and Polishing Plant** and want to correspond with parties having articles that can be made in such a factory. Address

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14 Wilmarth.
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22 New Haven.
Stevens Pulley.
14 Fifeild.
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12 Harrington.
18 Prentiss.
16 Putnam.
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8 Barker & Chard.
6 New Haven.
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One 16 in. x 36 in. Wetherill Corliss Engine, practically new.
Large stock of Corliss, Automatic and Plain Slide Valve Engines.
Horizontal and Vertical Boilers, all sizes and descriptions.
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Lot of light relaying rails.
Contractor's Plant For Sale or Rent.

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1 34 x 60 Right Hand Horizontal Engine with 24 ft. 30 ton fly wheel.
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Second-hand Steam Engines, Boilers and Pumps. Large variety of sizes and makers.
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Machinery bought, sold and erected.
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1 1000 H. P. Austin open heater.

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42 inch Schellenback Pulley Lathe, Bores and turns simultaneously.
1 Newton Facing and Milling Lathe.
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Engine Lathes, 10 in. to 32 in. swing.
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Feed and Power Presses, a variety of sizes.
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We have fifteen smaller and medium sized Single, Double and Four Drum Engines in stock. Steam and Centrifugal Pumps? Twenty-four various sizes and makes.

Lidgerwood Cableway, 1,000 ft. span.
Boiler and Three Drum Engine.
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One second-hand 10 in. Slotting Machine.
One second-hand Up-Setting Machine with 1 1/2 to 2 in. capacity.
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One second-hand 24 to 30 in. x 20 ft. centers, modern Screw Cutting Engine Lathe.

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14 x 4 ft. 6 in. Putnam.
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120 in. Hyd. Wheel Press.
132 x 14 Pond.
18" ment Single Axle Lathe

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119 1/2 x 14 1/2 x 43 Ames Screw
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14 ft. 6 in. Sellers Plate.

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19 in. Crank, Bement.
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1 16 in. Fric., Putnam.
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Second-hand Engines, Boilers, Iron and Wood Working Machinery**FOR IMMEDIATE DELIVERY.**

1 2 H.-P. Bryant Oil Engine, good order and complete.
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Horizontal Engines.

One 26 in. 42 in. x 48, Weisel & Vilter, Corliss Horizontal, Cross-compound, Condensing Engine
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One 14 in. 36 in., Vilter Corliss Engine.
One 16 in. x 16 in. Ball Automatic Engine.

Tubular Boilers.

Three Horizontal Tubular, 66 in. x 16 ft. Boilers.
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Three Horizontal Tubular, 60 in. x 16 ft. Boilers, each with Orvis patent furnaces.

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In the 3d, 4th, 5th, 6th and 7th pools of the Monongahela River.

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In tracts of five, ten, twelve and seventeen thousand acres each, are cheap and are being sold rapidly to Eastern capitalists.

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FIFTEEN THOUSAND ACRES OF COAL IN CENTRE AND CLINTON COUNTIES, PA., ON THE BEECH CREEK RAILROAD, SUITABLE FOR SHIPMENT EAST.

TEN THOUSAND ACRES OF COAL ON THE MAIN LINE OF THE PENNSYLVANIA RAILROAD, CONTAINING FOUR VEINS OF COAL, MOSTLY ABOVE WATER. JOHN FULTON, MINING ENGINEER OF JOHNSTOWN, PA., ESTIMATES OVER 80,000,000 TONS OF COAL ON THIS PROPERTY. WILL BE SOLD CHEAP TO A PROMPT BUYER.

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ROOTS', second hand, bought, sold or exchanged.

All my blowers are overhauled by expert blower machinists.

I do not advertise a "fake" list of blowers not in my possession; my stock is constantly changing.

Write for particulars and prices.

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18 ton Yale & Towne Standard Gauge Locomotive Crane
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NEW YORK OFFICE,
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FOR IMMEDIATE SHIPMENT.

30 in. Bullard Swivel Head Turret Mill.
37 in. Bullard Mill, two heads.
42 in. Bullard Swivel Turret Head Mill.
76 in. Bullard Mill, two heads.
30 in. x 30 in. x 8 ft. Pond Planer, new pattern.
36 in. x 36 in. x 10 ft. Cincinnati Planer, two heads.
36 in. x 36 in. x 14 ft. Cincinnati Planer, two heads.
40 in. x 17 ft. Triple Geared Fish Engine Lathe.
No. 2 Bickford Radial Drill, plain.
No. 3 Bickford Radial Drill, plain.
No. 3 Bickford Radial Drill, full Universal.
No. 2 Cincinnati Plain Back Geared Milling Machine.
No. 3 Cincinnati Plain Back Geared Milling Machine.
No. 3 Cincinnati Full Universal Milling Machine.
33 in. Gould & Eberhardt "Victoria" Pattern Gear Cutter.
24 in. Gould & Eberhardt Extension Base Shaper.
No. 3 Colborn Key Seater.
24 in. American Turret Lathe.
30 in. x 16 ft. Lodge & Shipley Lathe.
36 in. x 12 ft. Lodge & Shipley Lathe, triple gears.
Send for our new catalogue.
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Two in. Rotary Pump. Douglas 1 1/4 in. feed Power Pump. Douglas 1 1/4 in. feed Power or Hand Pump. 7 in. x 8 in. Gould Triplex Power Pump. 4 in. x 5 in. Baldwinville Power Pump. No. 5 Acme Valley Pump. No. 2 Acme Valley Pump. Hall Air Pump. 5 in. x 7 in. Cylinder. Knowles Duplex Pump and Receiver, cylinder 4 1/4 in. x 2 1/2 in. x 4 in. Valley Duplex Steam, cylinder 5 1/4 in. x 3 in. x 5 in. Dean No. 2 Steam Cylinder. Knowl's Steam Cylinder. Ames Steam Cylinder. Write for list.

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DEALERS IN

New and Second-Hand Machinery PROVIDENCE, R. I.

For Quick Sale.

BRICK PLANT.

Henry Martin Brick Machine, 25,000 cap.
Pug Mill, Newton Sander, turn table, \$300.

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Hor. Arc Light, 35 Light T. H. Dynamo.
50 H. P. Westinghouse Compound Engine, \$600.

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Two 75 H. P. Horizontal Tubular Boilers, good for 90 lb. steam pressure, \$400.

TRACK SCALE.

20 ton Howe Track Scale, \$90.

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Must Be Sold Quickly.

1 16 in. x 24 in. Russell four-valve engine, \$850.
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3 150 H. P. Tubular Boilers, each \$450.
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1 70 K. W. G. E. Alternator, \$550.

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Rivet Machines State make, capacity and price.

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Special Bargains.

3 66 in. Power, Back geared, Squaring Shears. Good order.

1 No. 4 Williams & White Bulldozer.

1 No. 4 Hercules Bulldozer.

1 80 in. Lathe, rod feed, triple geared.

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READ CAREFULLY.

For Sale-Bargains.

40 H. "Otto" Gas Engine..... \$400
30 H. "Otto" Gas Engine..... 300
10 H. Sterling, Charter Gas Engine..... 200
14 x 20 Slide Valve Engine..... 200
25 H. "Russell" Horizontal Steam Engine..... 100
6 H. "Kriebe" Engine..... 75
50 H. Horizontal Tubular Boiler..... 225
26 H. Portable Engine and Boiler..... 150
6 H. Upright Engine and Boiler, NEW..... 110
60 in. "Huyett & Smith" Ventilating Fan..... 40
No. 1 "Sturtevant" Blower..... 12
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300 H. "Austin" E. Heater..... 120
100 H. "Murphy" Pressure Heater..... 75
30 H. "Kroeschell" E. Heater..... 30
34 x 10 "Putnam" Engine Lathe..... 350
Complete Belt Power Elevator..... 100
68 in. x 20 in. Steel Rim Double Arm Pulley..... 25
30 in. x 20 in. Steel Rim Friction Clutch Pulley..... 25
28 in. x 10 in. Steel Rim Friction Clutch Pulley..... 20
15 H. Firebox Horizontal Boiler..... 85
20 H. Firebox Horizontal Boiler..... 100
30 H. Center Crank Engine..... 90
All guaranteed.
PARADOX MACHINERY CO., 181 E. Division St., Chicago.

PARTIAL LIST OF SECOND-HAND MACHINERY IN STOCK.

1 60 H. P. 54 in. x 16 ft. Tubular Boiler.
2 50 H. P. 6 in. x 16 ft. Tubular Boilers.
2 125 H. P. 66 x 18 Tubular Boilers.
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1 100 H. P. Baker Automatic 14 x 20.
1 100 H. P. Atlas Automatic Engine.
1 150 Buckeye Automatic Engine, size 16 x 18.
1 125 Buckeye Automatic Engine, size 14 x 16.
1 100 H. P. Ball Automatic Engine, size 13 x 12.
1 30 H. P. 8 x 10 Payne Auto. Engine.
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1 12 x 12 x 10 Worthington Duplex Pump.
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1 Deane Duplex Power Pump, 5 in. plungers.
1 No. 7 Cook and Chick Single Pump.
1 200 H. P. Berryman Feed Water Heater.

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Mill Engines.

1 24 in. & 38 in. x 60 in. Tandem, Allis, Tangye frame
1 26 in. x 48 in. Allis Corliss, Right hand, condensing. Wheel 18 ft. dia., 32 in. face.
1 18 in. x 42 in. Allis Corliss Condensing, wheel 18 ft. diam., 22 in. face.
1 16 in. x 42 in. Allis Corliss.
1 11 in. and 19 in. x 24 in. Tandem Compd., Buckeye.
1 16 1/2 in. x 25 in. x 15 in., Cross Compd. Armington & Sims.
1 18 in. & 30 in. x 16 in. Westinghouse comp'd.
1 16 in. & 27 in. x 16 in. Westinghouse comp'd.
1 10 in. x 12 in. Watertown Automatic.
1 12 in. x 13 in. N. Y. Safety "
1 13 in. x 15 in. McIntosh-Seymour Automatic.
2 13 in. x 14 in. Watertown "
1 14 in. x 13 in. Armington & Sims "
1 15 1/4 in. x 16 in. N. Y. Safety "
4 16 in. x 16 in. Ball "
2 16 in. x 16 in. Cooper "
1 18 1/4 in. x 18 in. McIntosh-Seymour "
2 40 in. x 72 in. International Power Co. Corliss Engines. Shafts 30 in. dia., 8 ft. between center of bearings. Wheels 24 ft. dia., 50 ton. 1 Right hand, 1 Left hand.

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2 375 H. P. Sterling Water Tubes for 150 lbs.
2 175 H. P. " " " " " "
2 200 H. P. National " " " " " "
3 72 in. x 16 ft. Return Tubular " 135 "
2 72 in. x 30 ft. " " 130 "

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1 600 H. P. Snow Condenser.
1 1000 H. P. Nordberg Condenser.
3 325 H. P. Davidson Condensers.

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Electrical and Steam Machinery,
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- 72 Providence Corliss.
- 72 Hamilton Corliss.
- 72 Harris Condensing Corliss.
- 48 Hamilton Corliss.
- 48 Hamilton Corliss.
- 42 Hamilton Corliss
- 42 Harris Corliss.
- 34 x 48 Compound Corliss.
- 42 Bullock Corliss.
- 24 Watertown Automatic.
- 30 Cummer 4 valve Automatic.
- 26 Buckeye Automatic.
- 20 Mansfield Slide Valve.
- 16 Slide Valve.
- 12 Slide Valve.

The above are all in first-class condition and ready for shipment.

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For Quick Delivery.

SINGLE VERTICAL PUNCHES.

- 36 in. throat, 1 1/4 in. in 1 inch plate.
- 30 in. throat, 3/4 in. in 1 1/4 inch.
- 24 in. throat, 3/4 in. in 1 1/4 inch.

SPLITTING SHEARS.

For 3/4 in. and 1/2 in. plate.

DOUBLE ANGLE SHEAR for 4 x 4 x 3/4 in. angles.

Plate-edge Beveling Shear, for 3/4 in. plate.
Gate Shear and Multiple Punch, 78 in.

BENDING ROLLS, 100 in., for 1 1/4 in. plate.

Hand Spacing Table, 8 ft.
Boiler Makers' Flanging Clamps, 10 ft.
Steam Riveter, 6 1/2 ft. gap.
Plate Planer, 6 ft. cut.
Duplex Vertical Engines, 9 x 9.

HILLES & JONES COMPANY,
Wilmington, Delaware.

BOILERS—ENGINE.

- 2 60 in. by 22 ft. Boilers; have 18 6 in. flues and Hawley Down Draft Furnaces.
- 2 20 in. by 48 in. Hamilton Corliss Engine, with 18 ft. Band Wheel, 24 in. face.

For Sale by

W. C. Johnson & Sons Mach'y Co.,
513-515 N. Second St., St. Louis, Mo.

FOR QUICK SALE.

- 1 No. 4 Clayton Duplex Air Compressor, 14 in. x 11 in. x 15 in., capacity 450 cu. ft. per min.
- 5 Double Rapid Bolt Cutters.
- 7 Single " " "
- 4 Double Solid Die Bolt Cutters.
- 4 Pointing Lathes.
- 5 Tappers.
- 1 46 in. x 17 ft. Engine Lathe.
- 9 2-Spindle Iron Table Shapers.
- 9 Speed Lathes.

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Good Tools!

Low Prices!

- 1 84 in. Triple Geared Engine Lathe.
 - 1 No. 3 Williams & White Bulldozer, Nearly New.
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 - 1 18 in. Traveling Head Shaper, 72 in. Traverse.
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Write for complete description.
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2nd-hand as well as new. All tested and guaranteed. BERRYMAN HEATERS a specialty. Our prices will surprise and please you.

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For Immediate Delivery.

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- 1 54 in. x 19 ft. Planer, double head.
- 1 60 in. Heavy Radial Drill, 5 inch spindle.
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- 1 No. 1 1/2 Pratt & Whitney Hand Milling Machine.
- 1 No. 2 1/2 Newton Duplex Milling Mach.
- 1 No. 5 Cleveland Auto. Screw Machine.
- 1 Lodge & Davis Screw Machine, 2 in.
- 1 No. 2 Jones & Lamson Screw Machine.
- 1 36 in. Hydraulic Wheel Presses.
- 1 16 in. Slotting Machine.

U. Baird Machinery Co.

123-125 Water St., 124-126 First Ave.,
PITTSBURGH, PA.

BARCAINS.

- 1 15 x 5 Fox Lathe.
- 1 13 x 6 Young Engine Lathe.
- 1 14 x 5 Putnam Engine Lathe.
- 2 1 in. Wire Feed Screw Machines.
- 3 3/4 in. and 1/2 in. Wire Feed Screw Machines.
- 2 Tapping Machines.
- 2 Hand Millers.
- 1 Foot Lathe.
- 2 Speed Lathes.

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MACHINERY BARGAINS.

Must be Sold at Once.

- 1 12 x 5 Reed Lathe.
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- 1 14 in. Shaper, Walcott.
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- 1 Johnson Bulldozer.

Wanted—Power Press, capacity 24 to 30 tons.
THE RACINE MCH. CO.
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Manufacturers using iron, steel or wood will find the best locations for successful plants along the

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These locations lead in cheap raw material, cheap, contented and desirable labor, cheap fuel and in good facilities for marketing products. Opportunities now open for establishing new plants are fine and should be investigated. Other investments will prove profitable in the South.

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3 Steam Pans, 20 ft. x 8 ft., with 3 1/2 in. Steam space
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Harrisburg, Pa. An Ideal Shipping Point

Have you ever experienced the need of a central distributing point for the eastern field? Many manufacturers now carry stocks of goods here. The best located man often gets the trade. You can RENT Large, Centrally Located Warehouses with attendants, of us, or you can BUY our former plant (we now occupy our new factory), well located for manufacturing or warehouse purposes. HARRISBURG FOUNDRY AND MACHINE WORKS

FOR SALE.

- One Pond Planer, 36 x 36 x 17 ft.
- One New Haven Lathe, 25 in. swing, 16 ft. bed.
- One vertical Engine 14 x 14, roughtry valve, self contain.
- One Sturtevant Steel Blower, 68 in. high, 26 inlet, 22 outlet.
- Also one Atlas 10 x 12 Engine.
- Also a large lot of iron tanks.

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SECOND-HAND, FIRST-CLASS ORDER

- 800 lb. Pratt & Whitney board lift automatic Drop Hammer.
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 - 14 ft. Boiler Plate Planer.
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 - 23 1/2 in. Barnes Drill, Back Geared.
 - 16 x 16 x 4 ft. Hendey Planer.
 - 32 x 32 x 9 ft. New Haven Planer.
 - 36 x 36 x 9 ft. New Haven Planer.
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FOR SALE.

- Four trains of plate rolls.
- One 9 ft. Fly wheel, new 7 in. bore; weight, 6,000 lbs.
- One Rod Straightening Machine, built by the Medart Patent Pulley Co. for straightening Rods up to 3 in. diameter and 25 ft. long.
- A lot of extra cold and hot plate rolls, new.

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- 13 in. x 48 in. Atlas-Corliss Engine.
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- 11 x 18 H. S. & G. Plain Slide Valve Engine.
- 12 x 18 H. S. & G. Plain Slide Valve Engine.
- 12 in. x 36 in. Babcock and Wilcox Auto. Engine.
- 12 in. x 16 Center Crank Slide Valve Engine.
- 16 in. x 24 in. Atlas Plain Slide Valve Engine.
- 12 in. x 7 in. x 10 in. Worthington Duplex Pump.
- 1000 lb. Ferris and Miles Steam Hammer.
- Also a number of smaller Engines and Pumps.

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FOUNDRY PLANT

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Address "FOUNDRY PLANT,"
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FOR SALE. Power Plant, Cheap.

One Engine, Cylinder 16 in. by 30 in.; governor; 8 ton fly wheel (more or less), 11 ft. dia., extra strong in section; band pulley 18 in. face, 3 ft. dia.
One Pierce, Stillwell Water Heater. 13 ft. of 3 in. Shafting, coupling and boxes. One Pulley, 12 in. face, 36 in. dia. One Pulley, 18 in. face, 30 in. dia. Stone foundation Capping. 33 ft. of extra double 18 in. Belting.
One boiler, 14 ft. long, 60 in. dia.; 32 flues; steam drum 14 in. dia., 12 ft. long; water column; safety valve; front; breeching. Iron Chimney, 28 in. dia., 60 ft. long. One Pump and all connections full capacity for boiler. Will be sold very cheap.
A machine shop and boiler makers' statement will be given as to condition.

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Root Blowers Nos. 1/4, 1/2, 1, 2, 4, 5 and 6.
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ENGINES AND BOILERS.

30, 15 and 20 horse Vert. Greenfield Engines.
6 horse Hoisting Engine, nearly new, cheap.
8 horse Port. Engine and Boiler, complete.
A. ASHER, 2d Floor, 109 Liberty St., NEW YORK.

Information for

We are headquarters for rebuilt motive power in every way. We cover all sales most extensive in the land.

WE OFFER THE FOLLOWING

ENGINES.

- No. A 900 1 E. P. Allis Co. tandem compound condensing engine, H.-P. nominal 500, fly wheel 2 ft. diam. by 40 in. face; cylinders 22 and 42 x 48; guaranteed to operate on 15 lbs. of steam per indicated horse-power. This engine is in excellent condition. It is at present installed at Omaha, Neb.
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- No. A 902 1 horizontal tange bed, side crank, Aut. steam engine, made by Russell & Co.
- No. A 904 1 Wright Aut. Corliss, 23 x 36.
- No. A 905 1 10 x 9 Westinghouse.
- No. A 906 1 8 x 12 Lansing automatic.
- No. A 907 1 7 x 12 Rice automatic.
- No. A 908 1 16 x 24 horizontal box bed, side crank.
- No. A 910 10 9 x 12 engines, manufactured by George W. Tift & Sons of Buffalo, N. Y.
- No. A 911 1 10 x 22 box bed, right hand side crank.
- No. A 912 1 16 x 36 inch Corliss left hand.
- No. A 909 1 12 x 16 F. C. Wells horizontal, tange bed, side crank.
- No. A 913 1 9 x 16 Rice automatic.
- No. A 914 1 11 x 16 x 16 McEwen tandem compound.
- No. A 915 1 8 x 10 Atlas automatic, center crank.
- No. A 916 1 11 x 18 Sinker, Davis & Co.
- No. A 917 1 12 x 16 horizontal box bed, side crank.
- No. A 918 1 10 x 14 automatic Wright & Adams.
- No. A 919 1 12 x 12 high speed automatic Ideal.
- No. A 920 1 20 x 24 box bed, balance valve.

In addition to the above we have on hand at all times a complete assortment of all size engines, ranging in power from 1 to 500 H.-P. Ask for our complete list.

BOILERS.

We still have on hand a few of Armour's 54 x 16, 60 x 10, and 72 x 18 horizontal tubular boilers. They are in excellent condition.

AIR COMPRESSORS.

- No. A 921 1 duplex straight line Clayton, 9 x 9.
- No. A 922 1 4 1/2 x 6 in. Clayton.
- No. A 923 2 12 x 16. Will compress air up to 60 lbs. pressure with 80 to 100 lbs. steam.

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We carry at all times a complete stock of short-lap, double thick leather belting, both new and second-hand. Our quotations are always 30 per cent. below market values.

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We carry a stock of all sizes of shafting.

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Ask for our complete list of steam pumps. We have all kinds.

A COMPLETE OUTFIT.

- No. A 924 1 McEwen tandem compound engine, 8 1/2 x 14 x 12 with a direct-connected multipolar, compound-wound dynamo, capacity 50 kw. Included in this outfit is a 100 H.-P. Sterling water tube boiler, with full front grate bars, &c. Also duplex steam pump and a copper tube heater. It was used about 24 years and replaced owing to a necessary increase in power.

Our Machinery Hall is 200 x 360 ft.

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Car of Scrap Steel in barrels; principally saw gummies.

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power. Our Machinery is absolutely warranted by a binding guarantee. Our stock is the

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- 1 500 light National, 1000 volt, alternating exciter, attached to shaft, complete with sliding base regulator and pulley, in first-class condition. Full description on application, also photograph.
- 1 Thomson-Houston, 400 light, compound-wound dynamo, new, 110 volts, 200 amperes, complete with sliding base, belt tightener and regulator.
- 1 Thomson-Houston, 500 light, compound-wound, 110 volts, 200 amperes, complete with sliding base, belt tightener and regulator.
- 1 United States Weston dynamo, 150 light, 100 volt, 75 ampere, complete with sliding base, belt tightener and regulator.
- 2 Generators, 80 kw., type U. S. Westinghouse bipolar, 350 revolutions per minute, 550 volts, size of pulley 54 x 18 in., paper rim, slide rails complete.
- 2 Field rheostats, Westinghouse, three-jaw switches for throwing generators in multiple.
- 1 Voltmeter, Westinghouse, 0 to 600.
- 2 amp. meters, Westinghouse, capacity 0 to 160.
- 1 amp. meter, Westinghouse, capacity 0 to 300.
- 2 Westinghouse circuit breakers.
- 3 Westinghouse lightning arresters.
- 3 Westinghouse switches, double throw.
- 1 electric motor, manufactured by the Keystone Electric Company of Erie, Pa.; self oiler, 60 amp., No. 324; 220 volt, 1025 revolutions, worm gear and cog are solid brass; 53 grooves for 1/4-inch cable on drum; drum 30 in. diam. by 22 in. face; the motor and gearing set on a cast iron base; this outfit cost \$1400; the worm screw and shaft are cut from solid forging and are steel; the motor is 15 H.-P.; the machine is geared to give a speed to the car of 150 feet per minute; was only in operation about 4 months.
- 1 Baxter 110 volt motor, 2 H.-P., good as new, complete with starting box, base and tightener. Price.....\$50.00
- 1 1000 light Slattery alternating current dynamo, 1000 volt, complete with exciter and instrument. Practically as good as new.
- 1 2 H.-P. Baxter motor, 100 volt, complete with starting box, base with belt tightener and pulley. First-class condition.

MISCELLANEOUS.

- 1 5-inch Judson governor.
- 1 5-inch Judson governor.
- 1 Worthington water meter.
- 1 500 H.-P. Excelsior feed water heater.
- 1 bench polishing machine, light from bench to center of spindle 9 in., diam. of spindle between flanges, 1 1/4, 1 1/2 or 1 3/4 in.
- 1 grinding machine with two speed pulleys designed to run two emery wheels up to 16 in. diam.
- 1 grinding machine as above, up to 18 in. diam.
- 1 grinding machine as above, up to 20 in. diam.
- 1 45 light Schuyler arc light dynamo.
- 1 spur gear, 12 ft. diam, 16 1/2 in. face, 5 1/2 in. pitch.
- 2 No. 4 Pulsimeter pumps.
- 1 iron planer 18 in., bed 5 ft. 6 in. long.
- 1 iron planer, 17 in., bed 5 ft. 6 in. long.

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We have a large stock of brand new lathes of all kinds. Ask for our complete list.

BLACK WROUGHT IRON PIPE.

We purchased at sale, 750,000 feet of brand new standard black wrought iron pipe, ranging in size from 4 to 10 in. Our complete list and low quotations will be sent on application.

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- Must be sold before Nov. 15th.
- 1 Ferracute No. 135 Geared Drawing Press.
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WANTED.

A Vertical Boring Mill that will accommodate work not less than 30 inch diameter.

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In manufacturing concern, Small Hardware. Inventory showing net assets of over \$50,000. City of 100,000. Incorporated 35 years. High reputation. Exclusive control of Several Patents. Machinery, Equipment, Dies, Tools, Lathes and Presses, all modern and up-to-date. No indebtedness. Business can be conducted in present location, or moved at small expense to a Western City, or amalgamated with other business, Saddlery or Builders' Hardware. President and General Manager in control, overworked and out of health, desires to retire. Excellent opportunity for established manufacturer to enlarge and increase business, or for father desiring to establish son in old established business. Principals only. Address in confidence.

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ENGINES, AUTO MATIC.

- 1 12 x 20 Atlas.
- 4 11 x 11 Westinghouse.

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- 1 16 x 24 Bovard & Seyfang.
- 1 10 x 10 Russell, High Speed.

BOILERS.

- 1 12 x 16, 34 in. flues.
- 2 72 x 14, 4 in. flues.
- 1 50 H. P. Upright.
- 1 12 in. Shaft, 24 ft. long, with couplings.
- 1 13 in. Shaft, 24 ft. long, with couplings.
- Tubing, Rods and Oil Well Casing.
- Second-hand Flues, all sizes, cleaned and cut to length.
- 100,000 ft. Standard Pipe, all sizes.
- 1 800 light Electric Machine.
- 1 50 H. P. Geary Water Tube Boiler.
- 1 Large Lot Pumps, different sizes.

McDOWELL & CO.,

347 Fifth Ave., Pittsburg, Pa.

WANTED.

21-in. Turret Lathe; 60-in. Vertical Boring Mill; 30-in. Drill; No. 2 Milling Machine; 14 in. Brass Finishing Lathe. Must be cheap, good, second-hand tools.

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FOR SALE.**SPECIAL ENGINES.**

- 1 in. x 20 in. (Vertical) Slide Valve.
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- 36 in. x 60 in. Tangye Bed type.
- Crane Elevator Co. Modern Elevator Engine.

BOILER.

Horizontal Tubular, 72 in. x 16 ft., with 84 3/4 in. tubes, approved for 100 lb. pressure, complete.

SHAFTS and PILLOW BLOCKS.

Very fine forged Shafts, finished all over, 10 in. diam. to 16 in.

FLY WHEELS. For Balance and for Belts.**SMOKE STACK.**

Very fine steel self-supporting stack, 64 in. diam., 100 ft. high, with base casting, ornamental top and ladder.

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- 1200 lb. Double Frame Steam Hammer.
- 4 ton do.

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- New Alligator Shear with capacity up to 2 1/2 in. Cold Billets, or for Scrap cutting. Knives 14 in. long.

LOCOMOTIVES, New and Second-Hand.

- *Signifies Right-hand.
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A modern Foundry completely supplied with up-to-date equipment, with a capacity of 12 to 17 tons daily, with a limit of 5 tons in one piece.

Best of light, and conveniences for high grade work, located in one of the best manufacturing centers in the Middle States.

The entire Foundry Equipment will be sold and the building leased for a term of years. Or the Equipment and building will be leased for a term of years at reasonable rates.

This is an unusual opportunity for parties to engage in Foundry business, as the Foundry has a good run of trade.

Parties desiring to manufacture a line of Hot Water or Steam Heaters, Radiators, or any line of work using castings, would find this an excellent opening, as much of the present trade could be retained if desired. Address in confidence,

"MODERN FOUNDRY,"

Care The Iron Age, New York.

Foundries for Sale.

Foundry site with excellent water power at Medina, N. Y.

Fine foundry buildings at Allentown, Pa., with railway siding.

Fine foundry buildings at Sing Sing, N. Y., with rail and water facilities.

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FOR SALE.

Entire plant for manufacturing
WOVEN WIRE FENCING,
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Care THE IRON AGE, New York.

WANTED.

To represent manufacturers of Staple or Heavy Hardware, Iron or Steel, Nuts and Bolts, &c., &c. Either by carrying a stock in New York City, or by selling direct from factory. Located in the centre of the Hardware district, we have ample storage room, office and large sales room on GROUND floor. Address

CHAS. J. STEBBINS & CO.,

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BARGAINS.

1 No. 1 Brown & Sharpe Universal Milling Machine.

1 Semi-Universal Miller, Worcester Machine Co.

1 24 x 24 x 6 Gray Planer, new.

1 26 x 26 x 8 Planer.

1 18 x 18 x 5 Planer, with chuck.

1 16 in. D. T. q. Gould & Eberhardt Shaper.

1 12 in. Shaper, heavy machine, Michels.

1 36 in. heavy Bk. Gd. Drill, Massinet Mfg. Co.

1 30 in. Back Geared Drill Press and Chuck, Davis.

1 13 in. Sensitive Drill and Chuck, W. & R.

2 No. 2 Garvin Screw Machines.

1 Gray Screw Machine.

1 13 in. x 6 ft. bed, No. 6 Barnes Engine Lathe.

1 24 in. x 16 ft. Engine Lathe.

1 24 in. x 12 ft. " "

1 24 in. x 10 ft. " "

2 20 x 8 Engine Lathe, chain feed, \$30.00.

1 18 x 8 " " Michels.

1 16 x 6 " " Blaisdell.

1 15 x 6 " " Star Tool Co.

1 14 x 6 " " Pratt & Whitney.

1 Graves Hydraulic Elevator and Car, complete, capacity 3,000 lbs.

1 2 x 3 Gould Triplex Power Pump.

1 No. 0 Knowles Single Acting Steam Pump.

BARGAIN IN POWER PLANT.

1 100 H.-P. Sterns Tubular Boiler, complete, flush front, fitted with Hawley Down Draft.

1 70 H.-P. Phila. Corliss Engine.

Above outfit complete with all valves, piping separator, heater and pan under fly wheel. All in fine condition, but little used.

MACHINISTS' SUPPLY CO., Rochester, N. Y.

FOR SALE.

One Hundred Open Top Square Iron Tanks. Mounted on wheels. Capacity of each, 22 cubic feet, or 166 gallons. For blue prints and prices send to

M. P. COLEMAN,

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Manufacturing Site To Lease.

All or part of plot, 200 feet front on Railroad Street, near 25th Street, by about 380 feet in depth, also River Front, and having connections to both Allegheny Valley Railroad and Pittsburgh Junction Railroad. For long or short term.

W. J. CARLIN COMPANY,

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FOR SALE.

\$10,000 stock of hardware. The best town in Southern Michigan. Address

"HARDWARE,"

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Tools lately in use in Boiler Manuf'g Plant.

1 40-ton 36 in. Gap Hydraulic Portable Riveter.

1 set 20 ft. Niles Rolls.

1 13 in. x 22 in. x 13 in. Westinghouse Engine

1 18 in. x 5 1/2 in. x 18 in. Barr Pump for 500 lbs. pressure.

For additional information, address

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WANTED.

A working interest in a gray iron foundry, or some iron industry. Can invest \$15,000.

"B. K., 1025,"

Care The Iron Age, New York.

Alligator Shears Wanted.

To cut 4 1/2 in. square iron cold. Must be in good condition.

PHOENIX HORSE SHOE CO., Joliet, Ill.

FOR SALE.

Combination Ice and Roller Skate Dies.

Patent for Elevator Stop and Lock.

Patent for Elevator Gate and Bar.

Send for our list of patents.

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FOR SALE.

One 2000 lb. Single Frame Steam Hammer

W. J. CARLIN COMPANY.

610-611 Lewis Bldg., Pittsburgh, Pa.

NEW YORK OFFICE:

514-515 Park Row Bldg., New York, N. Y.

ASSIGNEE'S SALE

OF

ROLLING MILL

AND

CUT NAIL FACTORY.

By virtue of a decree of the Court of Common Pleas of Centre county, there will be exposed to public sale at the Court House in the borough of Bellefonte, on

TUESDAY NOVEMBER 27, 1900,

At 2 o'clock P. M.,

All those several parcels or tracts of land, seven in number, specifically described in the deed from the Bellefonte Iron and Nail Company to the undersigned, as assignee, recorded in Miscellaneous Book "K," page 63, containing in the aggregate about twenty-two acres, fronting on Spring Creek and the Bald Eagle Valley Railroad, having a frontage of nearly half a mile on the latter, on which are erected a rolling mill, nail factory, warehouse and other buildings connected therewith. The capacity of the rolling mill is about fifty tons per day. There are fourteen puddling furnaces, three heating furnaces, rotary squeezer, fourteen inch train, extra rolls, etc. The nail factory contains fifty three nail machines, of which thirty are equipped with self-feeders, and has all the ordinary appliances and conveniences for the manufacture of cut nails. The property is in good condition and cost originally about \$180,000. It is within a few rods of the Central Railroad of Pennsylvania and can be easily connected therewith, giving an outlet either by the Pennsylvania system or by the Reading and New York Central systems east, west and north. The furnaces in the neighborhood furnish sufficient mill iron to keep the mill employed and the advantages in the saving of freight, etc., together with the low price of coal, constitute in themselves a fair profit over ordinary conditions.

TERMS OF SALE:—Ten per cent. in cash at time of sale; one half of the balance at the confirmation of the sale and the remainder in one year thereafter with interest, to be secured by bond and mortgage. Detailed information furnished by the undersigned.

THE COMMONWEALTH GUARANTEE, TRUST AND SAFE DEPOSIT COMPANY,

Harrisburg, Pa.

Assignee of the Bellefonte Iron and Nail Company.

WANTED.

Two second-hand broad gauge cinder kettles of Weimer or Hartman type. Address with description and price,

E. W. PORTER,

35 Manhattan Building, Philadelphia.

TO MANUFACTURERS WISHING CONSOLIDATION.

A company with ample facilities, in order to operate its plant to full capacity the entire year, wishes to absorb, by consolidation or otherwise, one or two large companies manufacturing in iron or wood. Request the correspondence of principals only.

"P. O. Box 533," Chicago.

FOR SALE.

One Westinghouse Compound Engine, 110 H.-P., complete with pulley, etc.

One Slide Valve, Box Bed Engine with 10 x 22 cylinder, 12 in. x 6 in. pulley.

Both of above are in first-class condition, and are replaced with one large engine

THE INDIANA MANUFACTURING CO.,
Peru, Indiana.

FOR SALE.

FOR CASH—NO TRADE.

A clean stock of hardware, tinware, stoves, paints, oils, glass, etc., best location on main street in northwestern city of over 31,000, showing an increase in population of 100 per cent. in last ten years. Stock about \$30,000. Sales for 1899 \$80,000. Will be that or more for 1900; have the best business in the city, no better business prospect in the United States. Good reasons for selling. Address "RARE CHANCE," care of Iron Age, New York.

FOR SALE.

Corliss Engine, 14 x 36, with balance wheel 9 ft. x 21 in. In excellent order, but is to be replaced with a larger engine. Can be seen running.

WILEY & RUSSELL MFG. CO.,
Greenfield, Mass.

Water Pipe FOR SALE.

About 15,000 feet 20 in. Cast Iron Water Pipe made by R. D. Wood & Co., 170 lbs. to foot, in 12 ft. lengths, in first-class condition for re-use.

Will be sold in lots to suit.

FRANK SAMUEL,
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BERKSHIRE IRON YARD, R. H. ROGERS, Owner. Scrap Iron, Metals, Etc.

221-223-225 Housatonic Ave.,
BRIDGEPORT, CONN.
TELEPHONE.

WANTED. SCRAP STEEL.

Give description and lowest spot cash price delivered Phila., Pa.

F. GREINER, 406 Drexel Building,
PHILADELPHIA, PA.

Wagon Tires, STEEL OR IRON, RD. EDGE OR SQUARE.

Angles Up To Four Inch.
LOGAN IRON & STEEL CO.,
BURNHAM, PA.
Buyers of Scrap for Cash.

I buy Iron and Metal Scrap and wish to hear from anybody having cotton ties, pipe, hoops, cast borings, wrought and steel turnings, boilers, cast scrap, etc. Also wrecks from fire, etc.

ROBERT M. CUNLIFFE,
1140-42 Washington Ave., Phila., Pa.

TELEPHONES 2440, 2441 AND 2442 BROAD.
B. NICOLL & COMPANY,
59 AND 61 WALL STREET, NEW YORK.
WIRE RODS,
BILLETS.
IRON ORE AND MILL CINDER.
FOUNDRY, FORGE, BESSEMER and BASIC PIG IRON.
Steel and Iron Scrap for Open-Hearth Furnaces Bought and Sold.
Furnace Agents, Exporters and Importers.

FOR IMMEDIATE DELIVERY. Angles, Beams, Channels, Plates, Tees, Zees, Bars.

5000 tons in stock. Moderate prices. Send for stock sheet and quotations.

STRUCTURAL DEPARTMENT,
ILLINOIS STEEL CO.,
Designers, Manufacturers and Erectors of
Structural Iron Work, Dealers in Structural Materials.

50 Wabansia Ave., CHICAGO.

FOR SALE.

4,000 tons 60 lb. steel relaying rails, with angle bars.
2,000 tons McKenna re-rolled steel rails, 55-56 lb. and lighter sections.
400 tons 56 lb. steel relaying rails with splices.
One mile 40 lb. steel relaying rails with splices.

ISAAC JOSEPH IRON CO.,
Swift Bldg., CINCINNATI, OHIO.
CHICAGO, ILL. SAVANNAH, GA.

SECOND-HAND RAILS

on hand and cut to order
Car load 12 tons 35 lb. Steel Rails. Hunt's inspection at \$25.00 per ton.
M. SAMUEL & SONS,
Kent Ave. and North 2d St., Brooklyn.
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BEAMS, CHANNELS, ANGLES, PLATES.

Eye Beams, from 4 ins. (7½ lbs.), to 20 ins. (65 lbs.)
Channels, from 4 ins. (5½ lbs.), to 15 ins. (33 lbs.)
Angles, from 1½ ins. x 1½ ins. x 3-16 in. to 6 ins. x 6 ins. x 1 in.
Angles, from 2½ ins. x 2 ins. x 3-16 in. to 6 ins. x 4 ins. x ½ in.
Zee Bars, 3 ins., 4 ins. and 5 ins.
Plates, 1½ ins. and over.
All material in 50-ft. lengths, or cut to specified lengths if desired. Send for detail stock list.
All material in stock, and will be shipped immediately on receipt of order.
Quotations subject to prior sale.
THE FOREST CITY STEEL & IRON CO.,
Cleveland, O.

WANTED.
Scrap Iron and Steel.
Correspondence Solicited.
C. Botjer, 405 Newark St., Hoboken, N. J.

FOR SALE.
A large assortment of iron and wood working machinery, consisting of lathes, planers, shapers, drill presses, bolt cutters, power hammers, moulders, surfacers, planers and matchers, joiners, universal woodworkers, rip and cross cut saws, swing cut off saws, boring and mortising machines, sanders, bangers, sharting, pulleys etc.
R. S. ARMSTRONG & BRO.,
Atlanta Ga.

RELAYERS FOR SALE.
Prompt Deliveries.
Standard and light sections subject to inspection. Only prime relayers handled by this firm.
Delivery Chicago, St. Paul, Kansas City, El Paso, Texas, Washington, D. C., and other points.
For further information write to
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Write us when you have Scrap to dispose of want to buy.

Scrap Iron, Steel and Iron Rails

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M. J. & M. BLAKE,
10th Ave. and 15th Street,
New York City.
Telephone Call, 897 18th St.

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JOHN LEONARD & CO.
IRON AND STEEL SCRAP.
IRON AND STEEL RAILS, PIG IRON, ETC.
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ST. PAUL BUILDING, NEW YORK.
TELEPHONE, 975 CORTLANDT.
Correspondence Solicited.

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OLD METALS
of every description purchased for cash, also
SCRAP IRON and STEEL
In carload lots.
Correspondence solicited.

E. O. MILES, President. J. W. RUSSEY, Manager.
Scrap Iron and Old Metals.
ATLANTA JUNK CO.,
278 to 298 Marietta St., Atlanta, Ga.
CORRESPONDENCE SOLICITED FROM
BUYERS AND SELLERS.

FOR SALE
RELAYING RAILS, Etc.
145 tons 45 lb. Steel, with Splices.
50 tons 30 lb. Steel, with Splices.
100 Box Cars, 50,000 lbs. capacity.
20 Flat Cars, 50,000 lbs. capacity.
MAY & SPALDING,
Atlanta, Ga.

FOR SALE.
Relaying Rails.
35 tons of 35 lb. steel, with splices.
800 tons of 50 lb. steel, with splices.
500 tons of 56 lb. steel, with splices.
Tidewater delivery.
THE STEEL RAIL SUPPLY CO.,
100 Broadway, New York City.

WANTED.
SCRAP STEEL.
Give description and price delivered our yard, Pottstown, Pa.
Donaldson & Newton, 421 Chestnut St.,
Philadelphia, Pa.

SCRAP
IRON or STEEL
WANTED.
E. B. LEAF & CO.,
820 Real Estate Trust Bldg., Philadelphia, Pa.

E. BISSELL & CO.,
WHOLESALE
HARDWARE AUCTIONEERS,
12 Murray St. and 15 Park Place, N. Y.
Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

FOR SALE.

We have lately purchased the site of the Pacific Rolling Mills in San Francisco and are now equipping same with a modern shipbuilding plant. In consequence, we have on hand and for sale, at a low price, the following:

One 8 inch, one 10 and one 12 inch Guide Mill, each complete with housings, guides, boxes, carriages, brasses, clamp bars, wongs, etc., etc., with full sets of roughing and finishing rolls.

One 18 in. Bar and Rail Mill.

One 28 in. Beam Rolling Mill.

Also with full sets of Rolls for each mill.

Also one Roll Turning Lathe, double header, for turning two rolls at same time. Bed 42 feet long by 5 ft. 6 in. inside way. Swing 3 ft. 9 in.

Four Tool Rests.

Four Roll Neck Rests.

Two Clutches for driving work.

In first-class shape with necessary tools for same.

Also one Roll Turning Lathe, double header; turns rolls 6 in. to 18 in. inclusive, two at same time. Wood Frame, 21 feet long and four feet six inches wide. Swing 4 feet. Iron guides. Tool rest and carriage fastened to wood foundation. Chucks for all sizes of rolls. Tools, countershafts, etc., all complete.

We have also quite a number of boilers and engines that have been used throughout the rolling mill, which we will sell at a low figure. Write and send for circulars.

RISDON IRON AND LOCOMOTIVE WORKS,

San Francisco, Cal.

NOTICE.

Party owning factory site, land and buildings, desires some company making good paying specialty to locate on same, with a view to taking an interest in the business. Address

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WANTED.

To correspond with parties manufacturing long and D shovel handles, with view of contracting for same in large quantities. Address

L. HUGH O'DONNELL, Washington, Indiana.

WANTED.

Ferro Silico, over 12% silico and under 1% carbon. Also Molybdenum, Chrome and Tungsten Ores.

THE AJAX METAL COMPANY, Philadelphia, Pa.

Help Wanted.

Undisplayed Advertisements for Help Wanted not exceeding fifty words, including address. One Dollar each insertion. Additional words two cents each.

Original letters of reference should not be inclosed with replies to advertisements appearing in these columns, as they are frequently mislaid and lost. A copy of the reference will serve the purpose.

DRAFTSMAN.—An all around man on Corliss engine work; also one skilled in the designing of all kinds of saw mill machinery; state age, experience and references. Address "E. S. M.," care *The Iron Age*, New York.

WANTED.—**SALESMEN** visiting the hardware and mill supply trade (or manufacturers direct) to sell a staple article as a side line for a liberal commission; correspondence solicited with manufacturers' agents in all cities of the United States and Canada. Address "Staple Article," care *The Iron Age*, New York.

WANTED.—A **SUPERINTENDENT** for a small but ambitious structural steel works; must be experienced in getting out and erecting general building iron work; must be a hustler able to crowd workmen and machinery to the fullest capacity; to a satisfactory man big wages will be paid. Address James H. McGill, Washington, D. C.

SALESMEN for Iowa, Indiana and Illinois to sell a complete line of coal and wood ranges and heaters, gas, gasoline and oil stoves, ovens and sheet iron goods for a large manufacturing company; none but first-class, capable men, thoroughly conversant with the above lines, need apply. Address "1901," care *The Iron Age*, New York.

WANTED.—A first-class **METAL MIXER**, thoroughly competent to take entire charge of a brass foundry. Address "Ferrum," care *The Iron Age*, New York.

WANTED.—**CHEMIST** as assistant in open hearth steel foundry, familiar with the analysis of iron and steel; state age, experience and compensation expected. "A. T. B.," care *The Iron Age*, New York.

WANTED.—A man to take charge of range boiler shop; state experience and salary to "Range Boiler," care *The Iron Age*, New York.

WANTED.—An **ASSISTANT SUPERINTENDENT** of a large foundry and machine shop; applicant must be active young man of experience, highest character and familiar with modern methods; lucrative position with good prospects for right man. Address "Ability, 111," care *The Iron Age*, New York.

WANTED.—An expert **SHOP COST ACCOUNTANT** to organize new system in foundry and machine shop; must come well recommended and have good record; state age and experience in application. Address "Gears," care *The Iron Age*, New York.

WANTED.—Middle aged man of prepossessing appearance to travel in the New England, Eastern and Middle Western States with a specialty; a good chance for one who is capable to handle the manufacturing trade and can figure on jobs for small gray iron castings as well; references must accompany application to receive proper consideration; only those having experience in foundry line need apply. Address "F. 111," care *The Iron Age*, New York.

WANTED.—**FOREMAN** for machine shop employing about 40 men; must be a thoroughly competent, experienced and capable man, familiar with drawings and capable of estimating machine work and directing work in shop; shop is well equipped and pleasantly located in a city of 50,000 in Eastern Ohio; line of work is principally contract and job work and a few specialties; state fully experience, age, salary expected and name past employers. Address Box 25, *The Iron Age*, Hamilton Building, Pittsburgh, Pa.

WANTED.—A practical rolling mill man, one thoroughly competent to operate an 18-inch plate mill; state nationality, previous experience, age, salary wanted and other information to the point. Address "E. W. P.," care *The Iron Age*, New York.

TRAVELING SALESMEN for every State and Territory in the Union to sell a new article as a side line to hardware and house furnishing goods trade; good commission. Address Box 298, Dubuque, Iowa.

Experienced HARDWARE or CUTLERY SALESMEN who thoroughly canvass one or two of the following States: Pennsylvania, Michigan, Indiana, Illinois, Kentucky, Missouri, Kansas, Colorado, Montana and coast, to take a side line of miscellaneous cutlery, butcher, putty and kitchen knives, &c. Address "Big Cut," care *The Iron Age*, New York.

Experienced SUPERINTENDENT for fan motor factory; must be expert mechanic and good handler of men; state experience, salary desired and give reference. Address "English Factory," care *The Iron Age*, New York.

Liberal Inducements to SALESMEN to sell mechanical goods to dealers and manufacturers in New England, New Jersey, Maryland, Virginia and Delaware. Address "Liberal," care *The Iron Age*, New York.

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Undisplayed Advertisements for Situations Wanted not exceeding twenty-five words, including address. Fifty cents each insertion. Additional words two cents each.

NEW YORK AGENCY WANTED: will represent concern manufacturing machinery, factory supplies or equipment; young man, now employed; eight years' experience. Address "R. D. W.," care *The Iron Age*, New York.

A young man with 13 years' experience in the hardware manufacturing and jobbing business, both in selling and general management, seeks a new connection where such experience can be utilized. Address "1211 L.," care *The Iron Age*, New York.

SALESMAN.—Man with 20 years' experience in light and heavy hardware; 10 years on the road; best references. Address "H. L. H.," care *The Iron Age*, New York.

As **FOREMAN** of light machinery, architectural or agricultural foundry; fully understand the most economic way of running foundry, either piece or day work and the mixture of irons; strictly non-union; 15 years' experience as foreman; good reason for wishing to make a change; A1 reference. Address "L. M. F. 118," care *The Iron Age*, New York.

Expert FACTORY SALESMAN, possessing wide acquaintance among jobbing and large retail buyers, is open for engagement January 1. Address "Factory Salesman," care *The Iron Age*, New York.

Single man, 42 years, well acquainted in Mexican and South American States, to travel and take charge of agency; best references; acclimated. Address "Agency," care *The Iron Age*, New York.

A position as **MANAGER** or **MANAGING SUPERINTENDENT** in a tin plate manufacturing works; a good mechanic; a thorough knowledge of the business in all its details; also a good bookkeeper; had many years' experience; good references. Address "T. P. W., No. 118," care *The Iron Age*, New York.

HARDWARE BUYER, young, thoroughly posted, 20 years' experience leading jobbers, wants position with progressive house where ability is appreciated. Address "Posted," care *The Iron Age*, Fisher Building, Chicago, Ill.

Man having ten years' experience in iron and steel business desires position as **OFFICE MANAGER**, **CORRESPONDENCE CLERK** or **SALESMAN**; thorough accountant; best reference. Address "Bert," care *The Iron Age*, Hamilton Building, Pittsburgh, Pa.

WORKS MANAGER, 45, technically educated, of sound record in iron, steel and machinery, will be open to engagement soon; wholly reliable; able to stop leaks and strengthen dividends. Address "C. E., No. 118," care *The Iron Age*, New York.

A thoroughly competent hardware, stove and expert cutlery man, now traveling and with years of experience in the Texas trade, will be open January, 1901, for engagement; references exchanged and correspondence solicited. Address "Texan," care *The Iron Age*, New York.

An iron merchant and agent living near Birmingham, England, who has a good connection with users of pig iron, steel billets, blooms, tin plate, bars, &c., will be glad to take up sale in Great Britain for American makers. Apply Joseph Hammond, Stourbridge, England.

Experienced mechanical engineer on machine tools and general machinery and furnace work desires change as **ASSISTANT ENGINEER**, **DRAFTSMAN** or **TRAVELING SALESMAN**; technical education; location desired, New England or Middle States. Address "V. K. E.," care *The Iron Age*, New York.

POSITION WANTED by first-class **IRON** and **STEEL CHEMIST**; best of references. Address "Chemist 1011," care *The Iron Age*, New York.

WANTED.—To represent manufacturer in Cleveland and Pittsburgh district; iron, steel or kindred lines; have acquaintance, experience and am located. Address 1430 Williamson Building, Cleveland, Ohio.

MACHINERY SALESMAN desires change; well balanced combination of engineering skill and commercial tact; can take charge of engineering department; up with the times; steel or wood construction, steam plants, power transmission, elevating and conveying machinery; want responsibility. Address "Versatile," care *The Iron Age*, New York.

An industrious **ROLL TURNER** is open for a situation; a capable, sober and energetic man. Address "Roll Turner," care *The Iron Age*, Hamilton Building, Pittsburgh, Pa.

Experienced engineer, 33 years old, college graduate, desires **SELLING AGENCY** or position as **LOCAL AGENT** in New York City for manufacturing concern of high standing; compensation in salary or commissions; highest reference. Address "Agent," care *The Iron Age*, New York.

A man with 10 years' technical and 20 years' commercial experience in production of iron and steel desires connection with some company in that line, preferably as secretary and treasurer. Address "X. 1018," care *The Iron Age*, New York.



THE IRON AGE

HAS BEEN AWARDED A

GOLD MEDAL

AT THE

PARIS EXPOSITION, 1900

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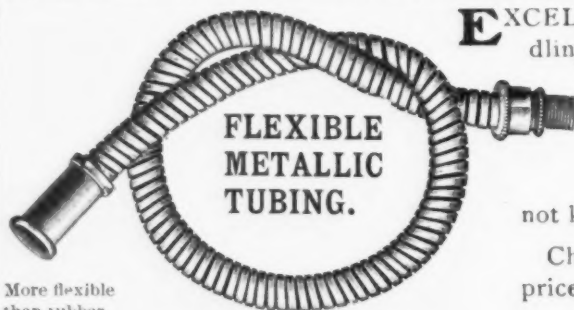
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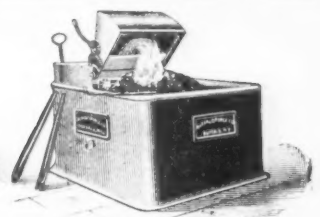
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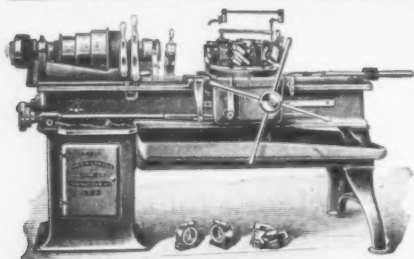
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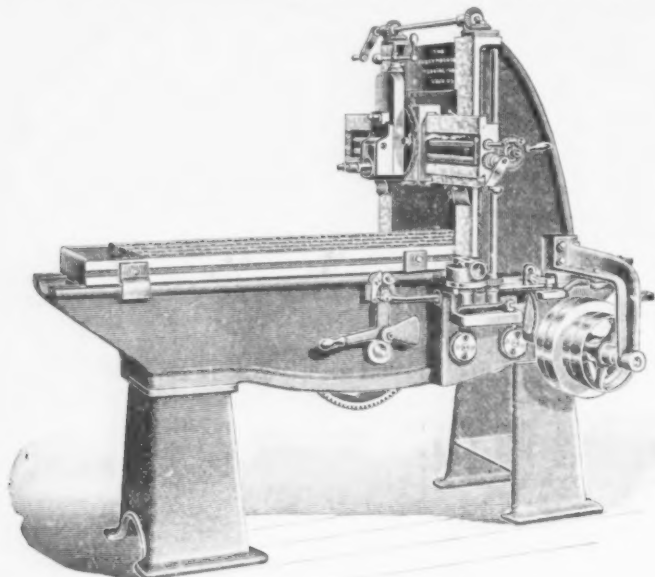
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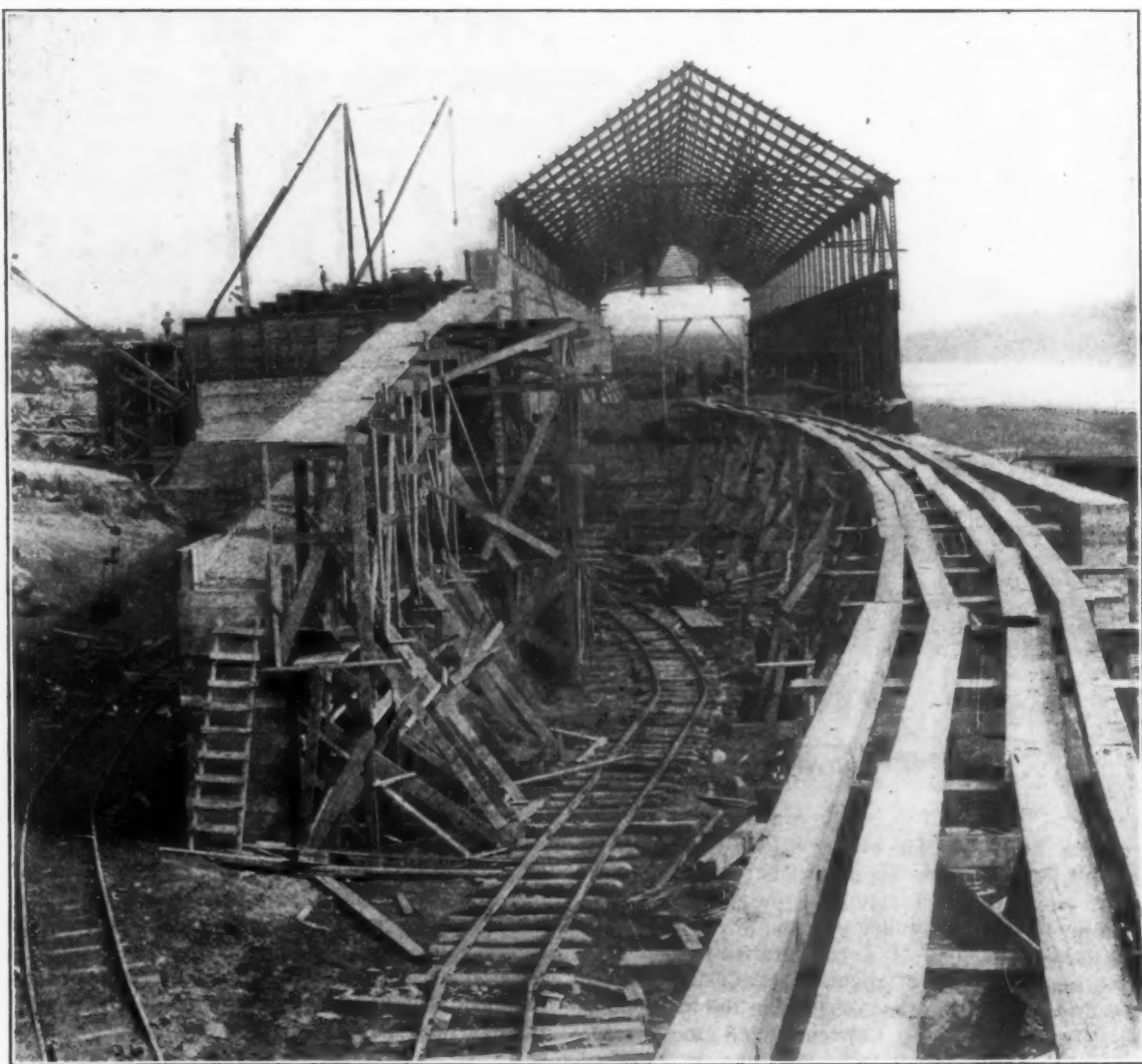
THURSDAY, NOVEMBER 8, 1900

ANOTHER GREAT HYDRAULIC POWER PLANT.

✓ THE ST. LAWRENCE POWER COMPANY'S UNDERTAKING.

Significant of the tendency of the times, another great centralized power supply plant is nearing completion in upper New York State. Like many other recent central stations, and notably the one at Niagara, the plant referred to will be driven by water power. It is being built by the St. Lawrence Power Company of New York,

power at low cost by taking advantage of natural conditions and the attracting of industries to the vicinity of the point of generation. In industries such as the manufacture of calcium carbide, aluminum and carborundum the greatest item of cost and first essential is that of electric power. The advantage of locating the works



End of Power House, Showing Dam Wall and Intake.

ANOTHER GREAT HYDRAULIC POWER PLANT.

who have given the construction contract to the St. Lawrence Construction Company, who have in turn sublet the work to the T. A. Gillespie Company of Pittsburgh. The St. Lawrence Construction Company bears the same relationship to the power company as did the Cataract Construction Company to the Niagara Falls Power Company.

The success of the hydraulic project at Niagara has marked the first step in the direction of generating

near the source of power is apparent when the great saving of the cost per horse-power is considered. Hitherto the power plant at Niagara Falls has been foremost in the list of large centralized power supply stations. Since 1895 there have been installed at Niagara ten 5000 horse-power Westinghouse generators. This plant affords a good basis of comparison for the new installation of the St. Lawrence Power Company, for which 15 5000 horse-power Westinghouse generators are under construction.

Only half of the order will be delivered at this time. This is by all odds the largest single order ever recorded for power transmission purposes. The immediate capacity of the St. Lawrence plant when completed will be about 40,000 horse-power, and additions will steadily be made which will give it an ultimate capacity of 150,000 horse-power.

The Project.

Briefly stated, the method of securing this power will be by diverting a small portion of the waters of the St. Lawrence River through a canal into turbines, which will be direct connected to electric generators, and thence into the Grasse River. The water is taken from the St. Lawrence River at a point opposite the lower end of Long Sault Island, and the terminal of the canal at the Grasse River is directly outside of the town of Massena, N. Y. At this point the power house is located, as indicated on the accompanying map, Fig. 3.

It is owing to the peculiar configuration of the coun-

through the power station, the wall of the station acting as the dam.

The Canal.

The canal, when completed, will be the largest in existence, when gauged according to the volume of water flowing through it, save the Baltic. It is to be 16,200 feet, or slightly over 3 miles, in length. According to present plans it will be 187½ feet wide at the base, 262½ feet wide at the water level, and 27 feet deep. Ultimately it will be considerably larger. The wet slopes of the banks will be one and a half to one and the dry slopes one to one. The canal has a wet cross section of 7000 square feet. With a maximum flow of 100,000,000 cubic feet an hour, the current will be less than 3 miles an hour. For this channel it will be necessary to excavate almost 8,000,000 cubic yards of earth, clay and gravel, about three-fourths of which has been removed. The average width of the bottom is now 140 feet, and the average width at the water level is 192 feet at pres-

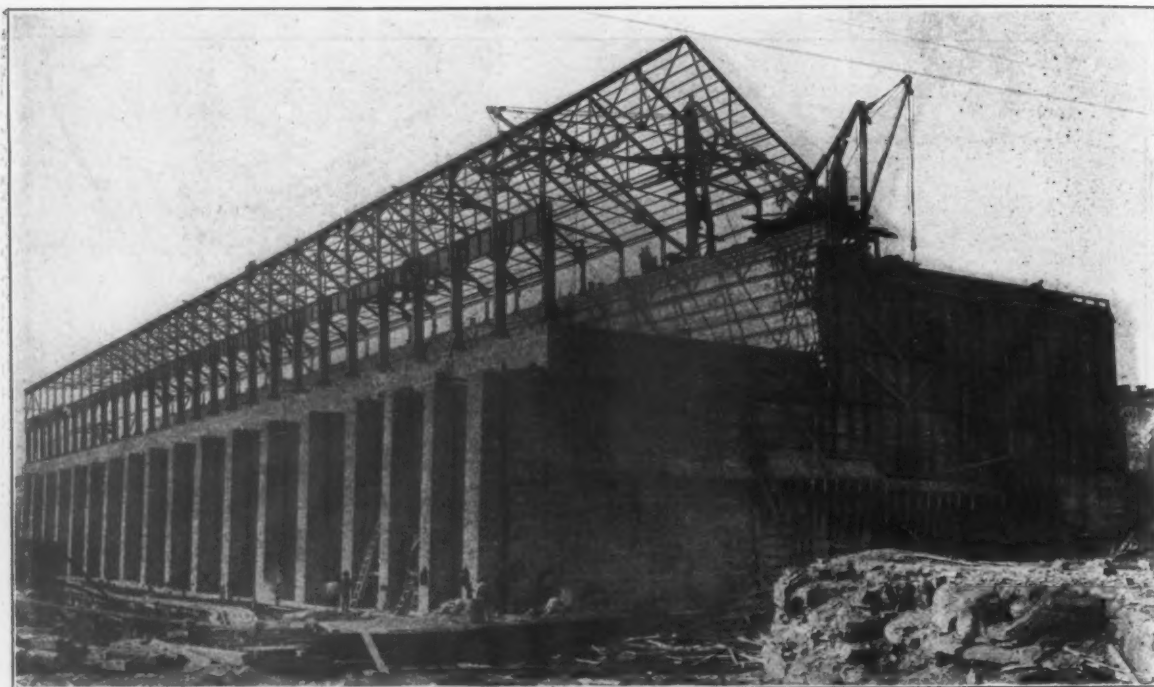


Fig 2.—Power House, Showing Dividing Walls of Tail Race.

ANOTHER GREAT HYDRAULIC POWER PLANT.

try on the American side of the St. Lawrence in the vicinity of Massena that this project is practicable. Nature has provided that at this point the Grasse and the Racquette rivers flow parallel with the St. Lawrence, to which they are tributary. A comparatively level plateau, marked by a series of slight, parallel ridges formed with considerable regularity, constitutes the intervening country between the St. Lawrence and the Grasse rivers. As will be seen from the map, a series of islands divides the St. Lawrence at a point where the Long Sault Rapids flow for several miles northward and eastward along the Long Sault Island, which divide the river into two parts. At the head of the rapids in the St. Lawrence the river level is at an elevation of 42 feet above that of its tributary, the Grasse. It will, therefore, be seen that by diverting a portion of the waters of the St. Lawrence at this point into the Grasse a fall of 42 feet will be obtained. This is what is being done by the company. The line of the canal is almost straight southeast, the Grasse River acting as a tail race and again emptying the water into the St. Lawrence at a point further down stream. On the bank of the Grasse at the intersecting point of the canal the great power house is located. In fact, the water of the canal flows

ent. In order to reduce the earth work a somewhat longer line than the present one was first contemplated, but the line which was finally decided to be the most advantageous was adopted at the expense of two heavy cuts. The northern of these is through the St. Lawrence Ridge; it has a length of 2250 feet, maximum depth of 80 feet, and 1,086,000 yards of excavation. A mile further south is the other, Andrew's Ridge. The cut here is of 85 feet maximum depth, 2500 feet long and involves an excavation of 540,000 yards. The forebay or basin immediately above the power house will be 310 x 120 x 25 feet deep. The canal will be crossed by two single span highway bridges of 408 feet span, on stone piers. One will be placed at the St. Lawrence and another about half way down the canal. A third roadway at the Grasse River end forms a cover to the turbine chambers and passes the length of the power house on the forebay side.

The Grasse River at the power house is of sufficient depth to serve as a tail race, so that no dredging will be required until after the development of 50,000 horse-power, and possibly not then. The available head at the power house is 32 feet.

It will be noted that Massena is situated at a point

convenient for shipping on two American and one Canadian railway systems, and that the great canal, when taken in conjunction with the Grasse River and the St. Lawrence River, forms a connection between the Great Lakes and the sea and an American waterway or passage around the Long Sault Rapids. At present the only passage around the rapids, which are unnavigable, is the Cornwall Canal, a Canadian project. In this connection it is suggested that there may be built an additional basin and a ship lock at the power house as a connecting link between the power canal and the Grasse River.

Methods Employed in Construction of Canal.

A variety of methods was employed in excavating the canal. The surface soil was taken off with Vivian scrapers and horse-power machinery. The deep excavations are being made by steam shovels and several types

Between the ridges the excavations were made principally with power scrapers and hydraulic dredges. The material which was encountered was largely a tenacious blue clay, with some gravel and bowlders, which frequently required blasting. A pleasant feature of the work was that no rock was encountered along the entire route of the canal, excepting on the immediate site of the power house, just where it was of the greatest benefit for the building of foundations.

In general, little water has been encountered in the shovel pits, and the surface drainage collected has been small. In some instances water has been pumped into the cut to facilitate the operation of suction dredges. Some of the clay was taken out by means of hydraulic vacuum pump dredges. These machines are of special design and have a capacity of about 4000 cubic yards each in ten hours. Each dredge has a rectangular hull

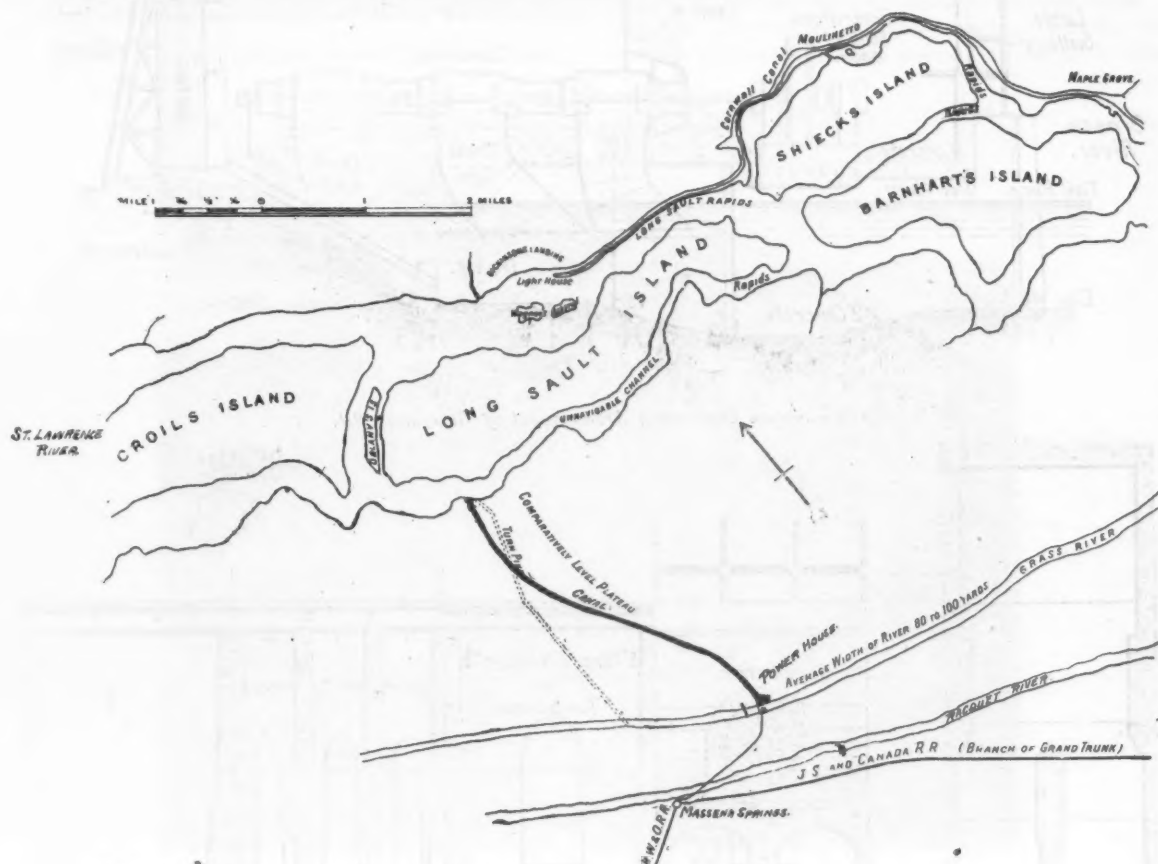


Fig. 3.—Map Indicating Course of Canal.

ANOTHER GREAT HYDRAULIC POWER PLANT.

of dredges. The work was divided into five sections—viz., the two ridges, the section between them, the section at the St. Lawrence River and the section at the power house. All excavation on the river section is made by floating dredges. On the power house section the excavation is made by dredges floating on water which was pumped into the pits where the work was started. The ridges are being cut out by means of dry excavations, the start having been made by pairs of steam shovels working toward each other. As the cuts deepened the clay and rocks removed were conveyed up an incline by means of narrow gauge cars to the spoil banks. A view of Andrew's Ridge, the larger one, is shown in Fig. 6.

The steam shovels which do not empty into the cars running over the inclines empty their buckets into 3 and 5 yard side dump cars, which are run over a temporary track through the cut and are hauled by locomotives to the spoil banks. Where the trains encounter steep grades they are aided by double drum hoisting engines, which operate two cables attached to the cars.

103 feet long, 34 feet broad and 12 feet deep. A 4-yard Hayward "orange peel" bucket brings up the clay and deposits it in a steel chute projecting transversely from the side of the bow. In this chute there is a shaft surmounted with a radial cutter, driven by an independent engine. The revolution of the cutter breaks up the material delivered into the chute. Disintegration is aided by four 2-inch jets of water at 25 pounds pressure, which can be directed toward any portion of the hopper. The contents of the hopper are discharged through an 18-inch pipe carried through the hull from end to end. The end of the flexible discharge pipe was frequently 500 feet distant and 50 feet above the discharge cylinder on the dredge.

The section between the ridges was excavated principally by Vivian scrapers. These made transverse trenches 9 feet wide, about 25 feet maximum depth and 15 feet apart, center to center. Each scraper had a rectangular 3-yard skip or pan 9 feet wide operated by a dumping cable and drawn by an endless cable. Both cables were operated by a 12¼ x 15 inch Lidgerwood

engine set in a head tower on one bank of the canal. The work of the scrapers was supplemented by that of a land dredge with an orange peel bucket, which made a cut 40 feet wide and 15 feet deep, delivering the spoil to dump cars on the upper level. A small cut made near the power house was filled with water from the Grasse River to float a Vivian suction dredge. This had a pivoted suction pipe 12 inches in diameter and 40 feet long, operated by a centrifugal pump driven at 200 revolutions and discharging through a pipe 200 feet long with

the Grasse River. The main building will be 700 feet long by 153 feet wide and 80 feet high. The present length is 360 feet. In the construction 80,000 cubic yards of concrete will be used, as almost the entire building, with the exception of the steel superstructure, will be made of that material. In Fig. 2 is shown an exterior view of the power house as it appeared on October 1. The side of the building facing the Grasse River is shown in this view, as is also the end of the building to which additions can be made as the canal is widened. The

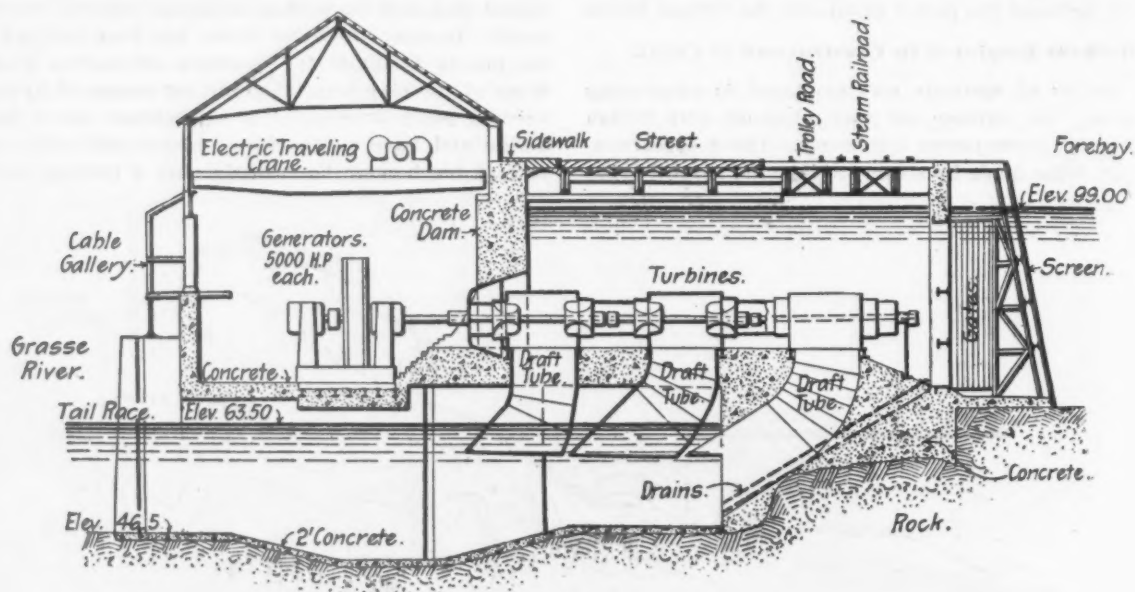


Fig. 4.—Section Illustrating Arrangement of Generating Set.

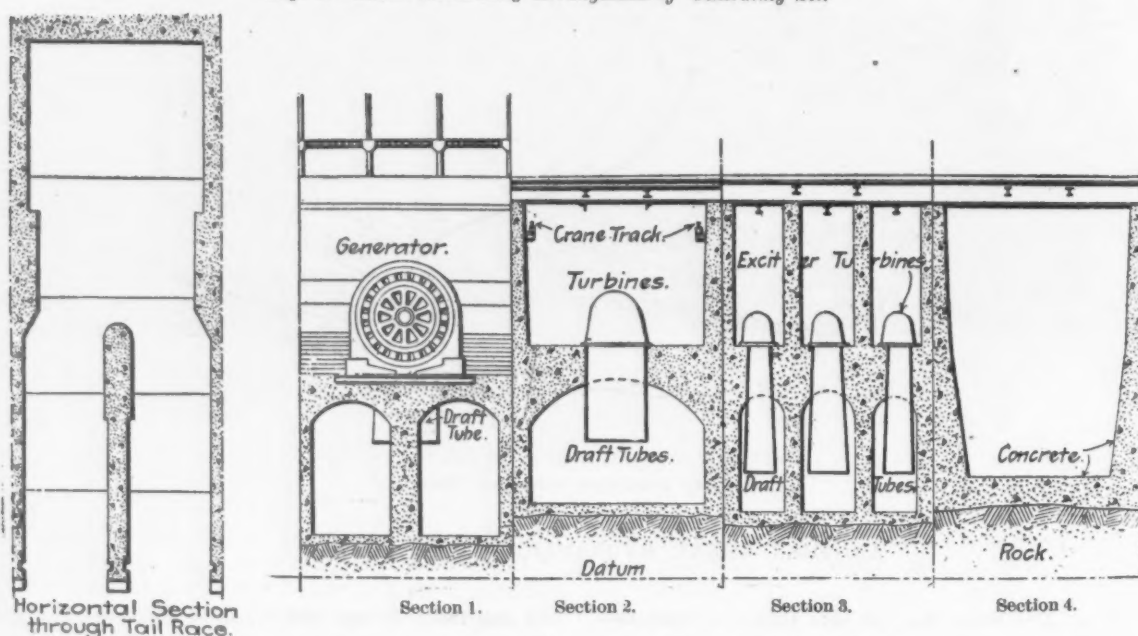


Fig. 5.—Sections Showing Tail Race Under Each Set of Draft Tubes.

ANOTHER GREAT HYDRAULIC POWER PLANT.

its outlet 20 feet above the pump. In hard material the bank was shattered by blasting before it was dredged, so that it crumbled in small pieces and did not bury the suction pipe. A hemispherical cutter head inclosed the inlet of the suction pipe and was operated by a shaft alongside of the pipe. The cutter was driven at a speed of ten revolutions per minute, being about 3 feet in diameter. It bored rapidly into the clay, loosening it sufficiently to allow the suction pipe to take it off. The Morris Machine Works of Baldwinville, N. Y., built the machine.

The Power House.

As previously stated, the foundations of the power house are cut in a ledge of rock on the north bank of

canal is built right up to the back of the building, so that in fact the building will be the terminal of the canal. In the engraving a hoisting engine is shown mounted on the wall which will act as the dam. The arches for the exit of the water from the draft tubes are also shown.

Fig. 1 shows an end view of the building, indicating the power wall and water inlet and the structure in which the generators and electrical machinery will be placed.

Fig. 4 is a section of the power house, showing the arrangement of the turbines and generators, as well as the gates and screen wall.

It will be noted that each generating unit consists of

three pairs of inward flow horizontal turbines mounted on a shaft coupled to the shaft of a 5000 horse-power generator. Two of the turbines will discharge into each draft tube. Each turbine will be 54 inches in diameter and each wheel will develop 1000 horse-power at its normal speed of 150 revolutions per minute. The draft tubes are riveted steel, 10 inches in diameter. Each of the shafts is 12½ inches in diameter where it passes through a water tight bearing 30 inches long. This bearing is in the dam wall where the shaft passes through into the generator room, as shown in Figs. 4 and 7. Large cast steel rings imbedded in the wall leave a circular opening of about 9 feet wherever a shaft is to pass through. The face of each ring is turned down to a flat bearing surface, the work having been performed after the wall was built around the rings. To this surface outside plates are bolted, which carry the water tight journals. Governors will be attached to the turbines.

The turbines for each unit are located in an independ-

inches long. Each of the machines will weigh 75 tons.

The equipment of exciters will consist of three 300-kw. machines direct coupled to the turbines and giving current at 125 volts at their normal speed of 275 revolutions per minute. The exciters are to be connected to a storage battery so as to run parallel with it at all times. This is done for the double purpose of keeping the voltage of the current passing through the fields of the generators constant and thus making their regulation an easy matter, and also of acting as a standby in case it should be found necessary to shut down the exciters.

The tail race under each set of draft tubs is shown in Fig. 5. Section 2 shows the tail race immediately underneath the draft tubes. At that point it consists of a waterway 32 feet wide, covered with a concrete arch of 19 feet radius. The arch is 6 feet thick beneath the center line of the turbines and the concrete walls separating the tail race channels are 6 feet thick. Beneath the generating tube room, where greater weight must be supported, it was deemed advisable to place a



Fig. 6.—View of Cut through Andrew's Ridge.

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ent chamber, separated from those on either side by a concrete wall 6 feet thick at the bottom and 4 feet thick at the top. Each chamber is provided with tracks for a traveling crane for handling the different parts and also with gates for excluding the water when it is necessary to clean the chamber or make repairs. The turbines rest on cast iron bed plates bolted to I-beams imbedded in the concrete foundations. The immediate installation will include seven generating sets, as shown in Fig. 5, and three smaller turbines operating three direct current generators, to be used as exciters for the main machines. The turbines are being furnished by the Stillwell-Bierce, Smith-Vaile Company of Dayton, Ohio.

The dynamos will generate three-phase currents at 2200 volts in each phase. The machines are of the revolving field type, with external armatures, the field having 20 poles with 12 slots per pole per phase in the armature winding. The manufacturers, the Westinghouse Electric & Mfg. Company of Pittsburgh, guarantee them for a normal output of 5000 horse-power and a maximum output of 7500 horse-power. The bearings of these machines are 16 inches in diameter and 65

support in the center, as shown in section 1. Consequently the tail race divides into two waterways, each 14½ feet span, with a wall 4 feet thick separating the waterways and a pier 5 feet thick directly under the generators. This is illustrated in the horizontal section, in Fig. 5, through the tail race. Section 3, Fig. 5, shows the draft tubes and tail race of the small exciter turbines, and section 4 is of the forebay behind the exciter turbines. Fig. 7 shows a general view of a set of the turbines, draft tubes and generator.

A platform is located at one end of the generator room for the electrical controlling instruments. A gallery walk connecting with it extends along the rear wall of the generator room. The cable gallery is in a lean-to outside of this wall. An 80-ton electric traveling crane will span the generator room.

In the switchboard arrangements there are a number of novel features. The platform from which the great machines are controlled is now located at the end of a gallery which skirts the entire south wall of the building. The enormous current is carried to a main switchboard by means of massive copper bus bars. This switchboard is operated from the platform which is now at the end

of the gallery, but which will be directly in the center of the station when the full 75,000 horse-power equipment now under contract is in place.

One man by manipulating a series of electric buttons, arranged on a small stand made desk fashion and semicircular in shape, controls the entire electrical equipment. The controlling stand will carry a number of marble slabs or tablets (one for each generator), upon which will be mounted small controlling keys. These keys are arranged on the interlocking system, and they will operate

tion, Fig. 8, shows the central controlling stand; in front of the operator, and raised high enough above him to afford a clear view of the floor of the entire station, are seen groups of indicating instruments in the circuits of the various generators. The operator has thus under his eye the huge generators themselves, their corresponding switches and indicating instruments, and in reach of his fingers are the electric buttons, by means of which the entire plant is regulated and controlled. This system affords a complete isolation of the different generators

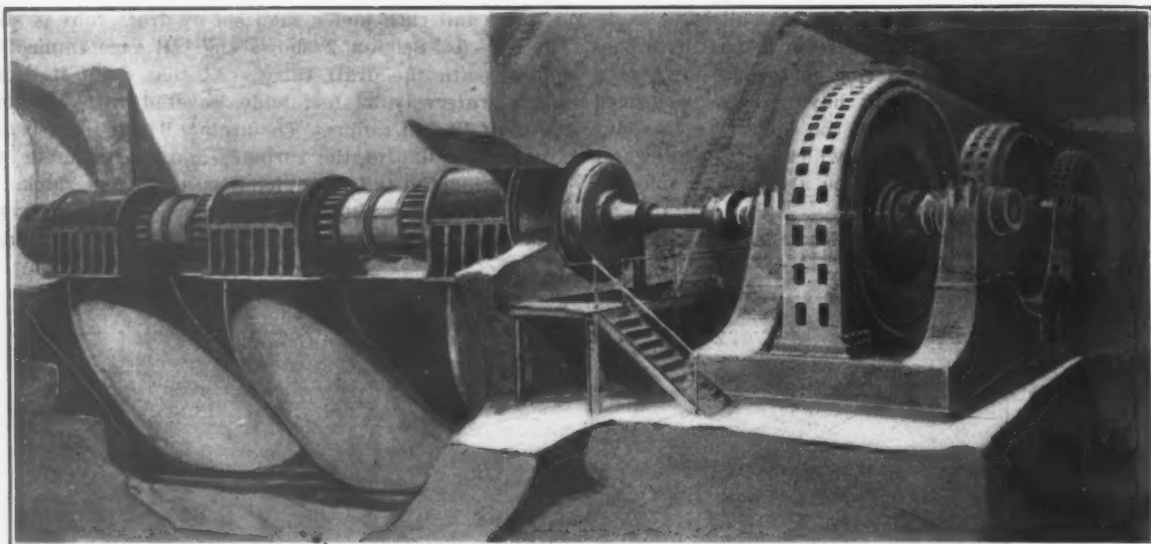


Fig. 7.—Arrangement of Turbines, Draft Tubes and Generators.

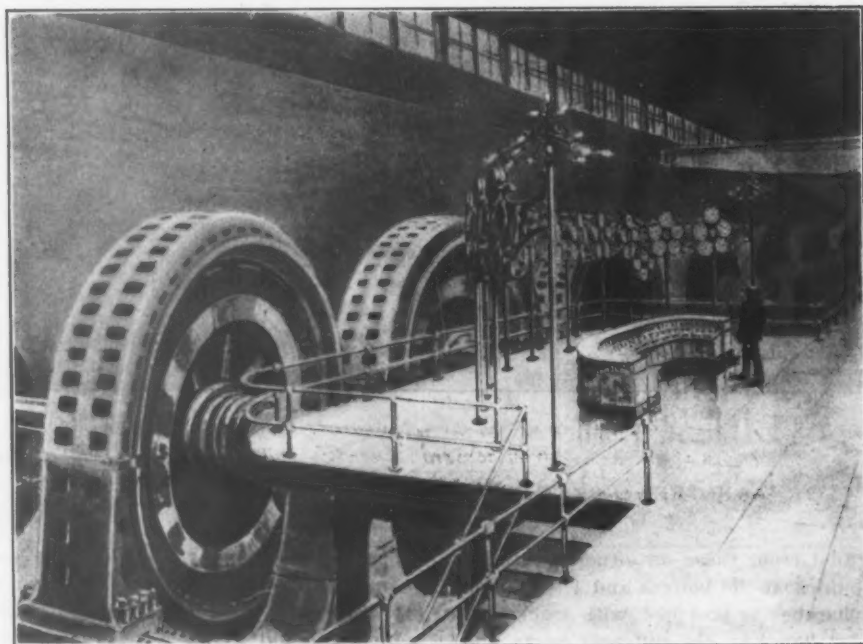


Fig. 8.—Switchboard Controlling Stand.

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by means of local battery circuits a series of compressed air valves and pistons. The latter will, in turn, control a series of 15 switching stands, one for each generator, equipped with the necessary cut outs and switches. The stand will be located under the raised platform and approximately opposite its corresponding generator. Each stand will carry three-pole carbon shunt circuit breakers, in series with which will be three-pole double throw switches. The circuit breakers and switches are controlled by means of compressed air, as previously stated, from the central controlling stand operated by the engineer. Stands, similar to the switching stands, are provided for the different outgoing circuits. The illustra-

tion, Fig. 8, shows the central controlling stand; in front of the operator, and raised high enough above him to afford a clear view of the floor of the entire station, are seen groups of indicating instruments in the circuits of the various generators. The operator has thus under his eye the huge generators themselves, their corresponding switches and indicating instruments, and in reach of his fingers are the electric buttons, by means of which the entire plant is regulated and controlled. This system affords a complete isolation of the different generators

In General.

The St. Lawrence Power Company own 1600 acres of land in the immediate vicinity of the power plant, which they propose selling to concerns who expect to locate

there and obtain their power from the company. They also own the Massena Terminal Railway, which runs from the power house to the junction of the New York Central Railroad and the Grand Trunk Railway. That the building of the plant to its full capacity will be put through without delay may be inferred from the fact that the company are now negotiating with parties who will require in the aggregate 80,000 horse-power.

William F. Zimmermann, vice-president and general manager of the company, is making the arrangements with concerns requiring power and is superintending the work generally.

The engineers of the St. Lawrence Power Company are John Bogart of New York, and Kincaid, Waller & Manville of London. William H. Cushman is the resident engineer representing these interests.

Robert Swan, vice-president of the T. A. Gillespie Company, is the resident engineer representing Mr. Gillespie.

The iron and steel structural work on the building and the bridges is being performed by the Hilton Bridge Construction Company of Albany, N. Y.

The Implement and Vehicle Manufacturers.

The National Association of Agricultural Implement and Vehicle Manufacturers held their seventh annual convention in Milwaukee, Wis., on Wednesday, Thursday and Friday of last week. The convention was one of the best attended in the history of the association. About 200 of the largest companies and firms in the United States engaged in the lines covered by the association were represented, and it is estimated that about 200 other persons were in attendance, including wives of members, representatives of related manufacturing interests, editors of trade papers and others.

The convention was welcomed to Milwaukee by Mayor Rose, and a suitable response was made in behalf of the association by H. C. Staver of Chicago. President W. C. Nones of Louisville, Ky., delivered his annual address, in which he indorsed the resolutions of the association in former years in favor of Congress creating a Department of Commerce and Industry, the establishment of a uniform classification of freight rates, the restoration of a merchant marine, the building of the Nicaragua Canal, the improvement of the parcel post system at home and abroad, the expansion of the foreign trade of the country and the improvement of the patent laws. In the way of new lines upon which to work he suggested a movement toward the reclamation of the arid lands of the West, of which there are 74,000,000 acres capable of supporting, it is estimated, 50,000,000 of people. The restoration of denuded forest areas with the aim of conserving water powers was urged, and it was suggested that the resolutions asking Congress to enact laws and make appropriations for these purposes would be presented to the convention. Co-operation with the various dealers' associations was suggested to the end that no goods may be sold to catalogue houses to the injury of the dealers engaged in the legitimate implement and vehicle trade. Action concerning the laws relating to corporations engaged in interstate commerce was also recommended.

The membership of the association, according to the report of Secretary Frank E. Lukens, was 373, showing a net gain of 19 in the past year.

Treasurer H. N. Wade presented his report, giving the receipts of the year at \$7072.77, including the balance from the previous year, while the expenditures had been \$4206.55, leaving a balance in the treasury of \$2866.22.

Committees were appointed as follows:

Nominating Committee: R. H. Foos, F. K. Bull, Frank Slosson, S. E. King, P. A. Myers.

Necrology: H. A. Cavanaugh, O. R. Baldwin and J. E. Porter.

Resolutions: E. D. Metcalf, J. H. Bradley, F. E. Meyer, B. T. Skinner and W. A. Meredith.

Judge Wm. E. Vincent of Chicago addressed the convention on legislation relative to interstate commerce.

The following officers were elected for the ensuing year: President, James A. Carr of Richmond, Ind.; chairman Executive Committee, W. S. Thomas of Springfield, Ohio; other members of committee: F. E. Meyers of Ashland, Ohio; H. C. Staver of Chicago; W. W. Collier of Detroit; treasurer, U. G. Orendorff of Canton, Ill.; secretary, Frank E. Lukens of Chicago.

The association adopted resolutions in favor of Congress making suitable appropriations for the irrigation and reclamation of the arid lands of the West; also resolutions strongly favoring united action for uniform

legislation in the various States not inimical to the national association, as well as favoring laws of an interstate character for the better transaction of the great business of the combined membership of the association.

Kansas City was selected as the place for holding the next annual meeting.

Elaborate arrangements had been made by the citizens of Milwaukee for the entertainment of the members of the convention and their friends. This entertainment included theatre parties, trolley rides about the city, carriage drives to points of interest and visits to a number of the large manufacturing establishments for which Milwaukee is famous not only in this country but abroad.

Handling Machine Shop Scrap.

In a paper before the St. Louis Railroad Club, J. A. Carney of the C., B. & Q. R. R. presented a method of handling machine shop scrap from the time it is made at the machine until it is loaded for shipment to some central point, where it is sorted into grades which will bring a maximum price. From this standpoint scrap divides itself into (1) borings and turnings; (2) punchings and shearings and odds and ends weighing not more than 5 or 6 pounds, and (3) large pieces. Borings and turnings should be collected in wooden trays set under the machine, thus catching nearly all the scrap; the small quantity which falls outside the trays can be collected by the sweeper, who wheels the scrap to a bin where it can be conveniently loaded into cars. At one shop this bin is arranged something on the coal chute order. The bins are filled from a platform on one side, and are so arranged that they can be emptied into a car on the other side by means of a suitable chute or apron. By this method no shoveling whatever is done. The only sorting that this kind of scrap can be given in most shops is to keep cast iron separate from steel and wrought iron.

Punchings, shearings, odds and ends, should be put into boxes of about 200 pounds capacity at the machine where they are made. These boxes, when full, are carried to the scrap shed, where they are piled up ready for shipment to the scrap dealer, or to a central point, where it is finally sorted. If the scrap is sold, the boxes are dumped into cars. If, however, it is going to some central point for sorting, the boxes filled with scrap are carried into the cars and piled up securely. At the central point the scrap is unloaded in the boxes, sorted, and thrown into the scrap bins, the boxes being returned to the point from which they started. The advantages of handling scrap in boxes are (1) reduced cost of labor for handling, and (2) sorting by natural selection.

The old method of piling scrap up on the ground, then when the pile got in the way to move it to some other place, handling it with a shovel or picking each piece up by hand, was expensive. Practice has developed that a 200-pound unit is an easy and convenient one to handle. The cost of handling small scrap by the old method amounted to about 20 cents per ton for each handling. By the box method it can be handled for about 6 cents per ton.

Where work on machines is fairly uniform the scrap made must necessarily be of about the same quality. This scrap, when collected and stored in boxes, requires little if any sorting. In this way machine shop scrap, blacksmith shop scrap and boiler shop scrap, especially that covered with scale and known as "lime" scrap, are kept separate, and can be sorted in 200-pound units much quicker and easier than if each piece, weighing a few ounces, is handled separately.

The boxes used are made of 1-inch unfinished pine, and are 24 x 14 x 5 inches deep, inside dimensions. The sides are extended to make handles for carrying, and the ends are bound with hoop iron.

Pieces of scrap too large to go into boxes are economical units in themselves, and are handled a piece at a time.

The box or unit method need not be confined to the machine shop, but is good anywhere for any kind of metallic scrap. It has been used successfully by section men in relaying track. Instead of throwing old track spikes and bolts on the ground, to be picked up later, the old and worn out material is thrown into the box and the section men are relieved of the labor of going over the ground to pick up after the work is done. It may take a little more time to use boxes, but, if intelligently done, the loss of time is small and the saving in labor great.

Instead of the iron fire proof curtains generally used in French theaters, one made of sheet aluminum has been adopted for the Opera House at Besançon. It is one-fifth the weight of an iron curtain of equal dimensions.

Points in the Manufacture of the Locke Steel Link Belting.

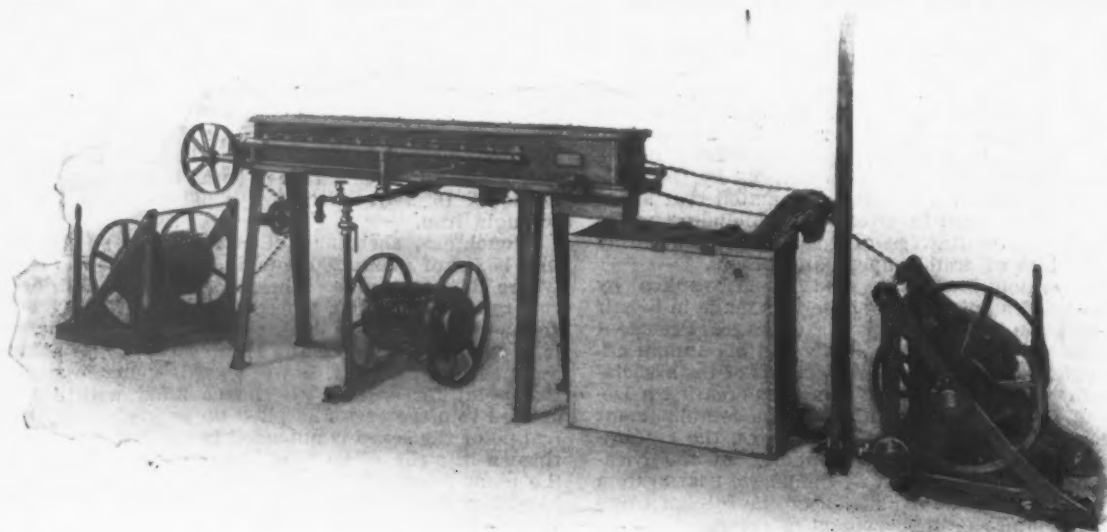
In *The Iron Age* of March 3, 1898, we described and illustrated a machine designed by the Locke Steel Belt Company of Bridgeport, Conn., for making a detachable steel link sprocket chain. The link is made from a blank or section of a strip of steel, which is slightly longer than the pitch of the finished link. The ends of the blank are formed up into quarter circles for the upper portions of the end bars, while the stock from the center is punched down and then rolled up to form the remaining portions of the end bars. By this method every part of the stock is utilized, and because of this very simple construction it is possible to make the link and the completed chain by an entirely automatic machine. The chain is made from a coiled strip of sheet steel, which is rolled to the required width and thickness. This is preferred to strips split from wide sheets, as the edges are rounded. The strip is automatically fed through the press, from which it emerges as a complete chain, all the links being joined together. The advantages of this chain rest in its strength, elasticity, durability and accuracy, and we may also say its lightness, compared with its great strength. The latter, of course, depends upon the amount of metal in the two sides and also in the bearing end of the link, its only chance of destruction being in the rupture of the sides or the straightening

After passing through the furnace the chain is guided through the cooling tank, from which it is wound upon a reel. This reel, shown at the extreme right in Fig. 1, is automatic in its action and winds the chain in perfect layers like thread upon a spool. Placed across the upper part of the reel is a rod, upon which are cut two threads or grooves, one being the reverse of the other. At each end these right and left hand threads are united. A guide is placed on this rod, a pin bringing it into engagement with the thread, so that it moves forward and back on the rod. The chain passes over this guide. A sprocket chain passes over wheels on the reel arbor and the threaded rod. It is evident that if the pitch of the thread equals the width of the chain the latter will be wound evenly. By changing the relative size of the two sprocket wheels the threaded rod may be made to handle chains of different widths.

After having been hardened the chain is tempered in the bath, shown in Fig. 2. This consists of a tank filled with tempering oil, which is heated to 520 degrees. A filled reel is swung over the tank and lowered into the oil, where it is allowed to remain until it has attained the same temperature as the bath. By this means the most perfect results are obtained.

Chains Arranged as Carriers.

The several views in Fig. 3 illustrate how the belting may be arranged to serve as a carrier. The attachments



Hardening a Chain.

POINTS IN THE MANUFACTURE OF THE LOCKE STEEL LINK BELTING.

of the bearing portion. Its accuracy is assured by the method of manufacture, and just so long as the dies maintain their true proportions one link is of necessity exactly like all the others.

Composition of Steel.

The machine for making the chain having been perfected, an extended series of experiments was necessary in order to find the steel best suited to the purpose. No trouble was found in working steels of widely varying compositions, since the distortion produced by the machine was by no means excessive. The principal difficulty was in finding the proper percentage of carbon, and upon this question authorities were by no means agreed. Some advised a high carbon content—from 0.40 to 0.70 and even as high as 0.80. These were hard to temper, the chain made of them being too brittle and being deficient in toughness. A steel of 0.30 carbon was finally selected. The writer saw two small chains of the same size tested. One was high carbon, the other 0.30 carbon. The first showed little or no elasticity and snapped like glass under a pull of about 600 pounds. The second has the elasticity of a spring and withstood more than twice the strain.

Hardening and Tempering.

A gas furnace of special design was introduced for hardening the chain. This furnace, shown in Fig. 1, marks an innovation in the arrangement of the flames. The floor of the box, which is lined throughout with fire brick, is on a level with the jets which enter each side. The chain rests upon this floor in its slow passage through the furnace and is always subjected to the direct heat of the flame. This has been found to produce more uniform and quicker results than heating by radiation.

may be placed upon the face of the link or upon either or both of the side bars, as may best meet the demands of the work. These attachments can be varied so as to conform to almost any requirements. The numerous testimonials received by the company prove the many advantages possessed by their belting.

The National Wagon Manufacturers' Association met in Chicago in annual session on October 30, representatives of 29 concerns being present. It was agreed that there should be no change in the price of wagons during the coming year. The following officers were elected: President, F. B. Suydam of the Wilbur Wagon Company, Toledo, Ohio; vice-presidents, George R. James of the James & Graham Wagon Company, Memphis, Tenn.; and F. L. Mitchell of the Mitchell & Lewis Wagon Company, Racine, Wis.; secretary and treasurer, H. M. Kinney of the Winona Wagon Company, Winona, Minn.

The contract for the construction of the Indianapolis & Martinsville Electric Railroad in Indiana has been let to the Dennis Construction Company of Pittsburgh. The road will be a little over 30 miles long, and the total cost, with equipment, is estimated at between \$700,000 and \$800,000. The Dennis Construction Company have just completed the building of the Cincinnati, Lawrenceburg & Aurora Electric Line.

Considerable car shortage exists in the Pittsburgh district in coal, steel, merchandise and grain. The requisition for cars far exceeds the supply. The only line of freight that is an exception to this condition is coke, for which the car supply is ample.

The Dividends of Metal Mines.

In the ten months ending October 31 the metal mining companies in this country reporting to the *Engineer-*

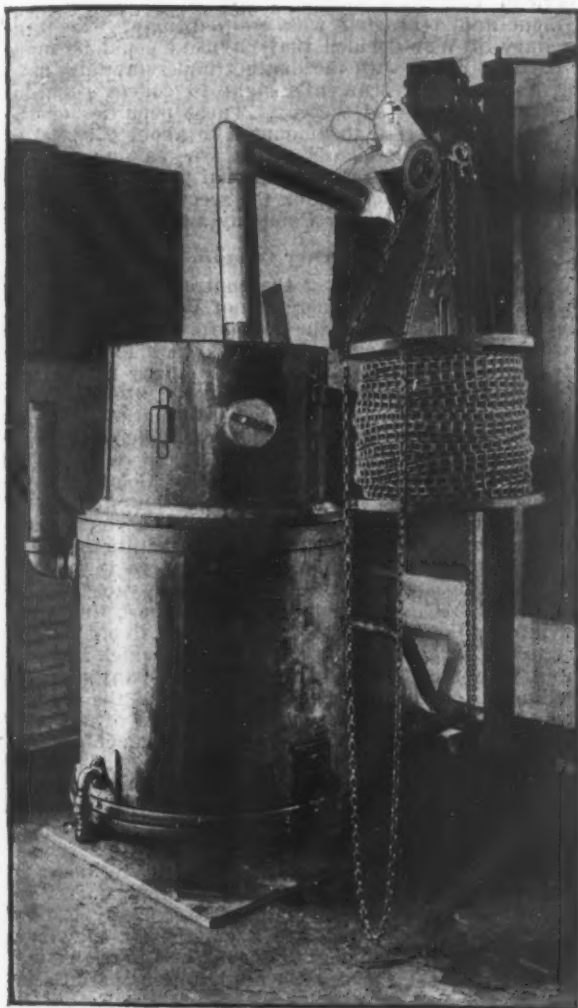


Fig. 2.—Tempering Bath.

trol the Anaconda and Parrot and have a large interest in other companies, declared \$6,000,000, or 8 per cent. on their capitalization. The Anaconda Copper Company are credited with paying \$4,800,000, or 16 per cent. on their capital stock; the Boston & Montana Company, \$4,200,000, or 113 per cent., and the Parrot Company, \$1,379,100, or 60 per cent. on their issued capital stock. The Amalgamated Company's dividend, however, is really a duplication, as they work no mines directly, and their dividend is derived from the stocks of other companies which they hold. Of the Michigan copper companies, Calumet & Hecla paid in the ten months \$5,000,000, or 200 per cent. on their capitalization; Quincy, \$900,000, or 36 per cent., and Tamarack, \$420,000, or 28 per cent. In California the Mountain Copper Company paid \$1,200,000, or 19.2 per cent. on their share capital. In Arizona the United Verde (ex-Senator Clark's property) are credited with paying \$1,650,000, or 55 per cent. on their capital stock, and the Arizona Copper Company, \$576,429, or 18 per cent. The next largest dividend payers in the ten months were the gold mining companies, which also produced some silver and lead. In this group the leaders were Stratton's Independence, Limited, of Colorado, with \$1,789,337, or 35.8 per cent. on their issued capital stock, and Portland, \$750,000, or 25 per cent. In South Dakota the Homestake Gold Mining Company are foremost with \$1,050,000, or 5 per cent. on their share capital. In Utah the Silver King Company paid \$750,000, or 25 per cent. on their capitalization, and the Daly-West Company, \$412,500, or 13.7 per cent. In Alaska the Alaska-Treadwell Gold Mining Company paid out \$300,000, or 6 per cent. on their capital stock. In Arizona La Fortuna Gold Mining Company lead with \$232,500, or 93 per cent. on their capitalization, and in California we have the Yellow Aster Company with \$130,000, or 13 per cent. Of the silver-lead dividend payers, those in Idaho are most prominent, being the Empire State-Idaho Mining Company with \$295,541, or 30 per cent. on their issued shares; the Standard Company with \$295,000, or 59 per cent.; Buffalo Hump, \$225,000, or 10 per cent., and the Bunker Hill & Sullivan Company with \$210,000, or 7 per cent. Of the lead and zinc mining companies in Missouri and Kansas, the St. Joseph Lead Company lead with \$112,500, or 4.5 per cent. on their issued share capital. There have also been numerous smaller dividend payers, especially in the gold and silver mining industry, while in the lead and zinc sections the number has grown less, owing in part to the end of the boom in the Joplin region.

Orders for car equipment continue large, due mostly to the heavy freight traffic. The Pennsylvania Railroad

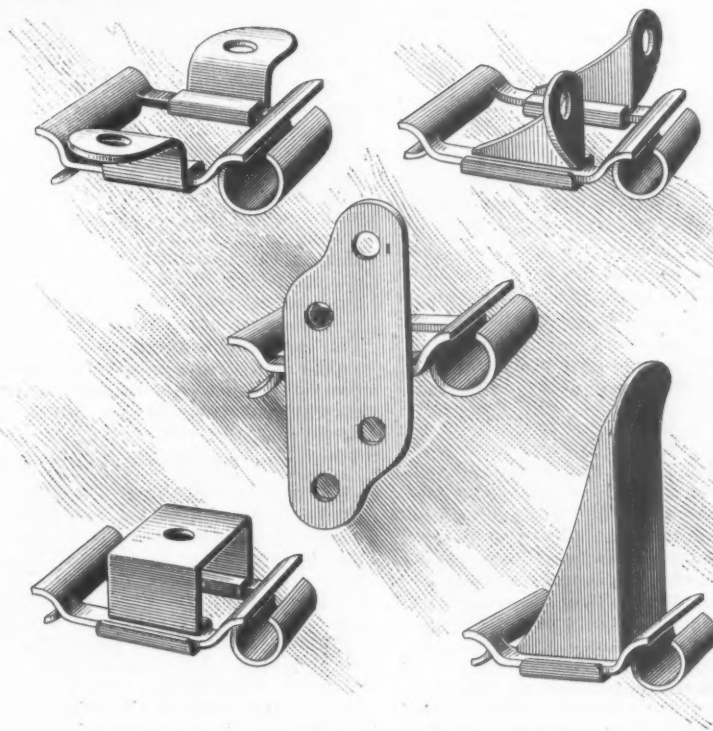


Fig. 3.—Chains Arranged as Carriers.

POINTS IN THE MANUFACTURE OF THE LOCKE STEEL LINK BELTING.

ing and Mining Journal paid a total of \$42,568,071 in dividends. During these ten months the largest dividend payers were the copper companies; of those in Montana the Amalgamated Copper Company, who con-

has just ordered an additional 1000 cars, of which 400 are to be of the box pattern. The Buffalo, Rochester & Pittsburgh Railroad has contracted for 500 hopper coal cars from the American Car & Foundry Company.

Contractors and the War Department.

The Driggs-Seabury Gun Contract.

WASHINGTON, D. C., November 6, 1900.—The Secretary of War within a few days will take up for final determination a notable case of much interest to manufacturers having contract relations with the Government, and the early history of which was published in *The Iron Age* some months ago. It concerns the extent to which contractors may become delinquent without forfeiting their contracts, or their rights to enter into new contracts, and the authority of the Secretary of War to grant indulgences to contractors who are in arrears.

The case was originally brought to an issue in the latter part of Secretary Alger's administration when the bid of the Driggs-Seabury Gun & Ammunition Company on a contract for certain rapid fire guns was thrown out by a ruling of the Assistant Secretary of War on the ground that the company were already in arrears on a previous contract. The action of the Assistant Secretary was taken during the absence of Secretary Alger, and was officially announced as establishing a precedent for the government of all contractors doing business with the Department. The Driggs-Seabury Company having appealed to the Secretary of War, a hearing was granted at which representatives of the American Ordnance Company, the only other bidder on the new contract referred to, submitted an argument in support of the Assistant Secretary's ruling, which was in part as follows:

"We beg to respectfully invite your attention to the fact that under the first contract for the manufacture of 20 6-pounder and 80 15-pounder guns and mounts with 300 rounds of loaded ammunition per gun, delivery of which, under the contract, was to begin within 60 days after the date of contract and to be completed on or about April 13, 1899, not a single gun, mount, or round of ammunition has been delivered down to the present time. Furthermore, the 15-pounders, being a new type of gun, type test is essential. But not even a gun has, so far as we are advised, passed the test. According to the terms of the contract penalties accrued to the estimated amount of more than \$200,000, but we are advised that the Ordnance Department remitted all penalties down to June 5, 1899, the date of the order of Acting Secretary Meiklejohn, which order forbade the remission of penalties in the future except by order of the Secretary of War. The bid for the second contract by the Driggs-Seabury Company was not above the actual cost of manufacture. Being already in default under a much larger contract they must have well known the importance of delivering the ordnance within the time required. Having already a Government contract for \$700,000 of ordnance, the prospect of the award of another for \$200,000 was well advertised in the public press, it is believed, for the purpose of improving their financial standing in the commercial world. . . .

"So far as we have been able to ascertain, the Driggs-Seabury Company have never since their organization furnished a gun or mount to the War or Navy Department. During the past two years the American Ordnance Company have furnished 488 guns to the War and Navy Departments and the revenue marine. It is believed there is a limit beyond which the Driggs-Seabury Company or any other company should not be permitted to impose upon the Department, and we further believe that that limit has been reached and passed. In view of the absolute incompetency of the Driggs-Seabury Company, as shown in the report of the Chief of Ordnance, and in justice to the manufacturers of ordnance who are able to carry out their contracts, it is respectfully submitted that if there be error in the decision of Acting Secretary Meiklejohn it is because he should have decided that the Driggs-Seabury Company were not a competent bidder for the second contract, and he should have decided that the contract be awarded the American Ordnance Company. Instead of deciding that new bids should be called for. As to the statements so adroitly put forth in the press that the American Ordnance Company are a trust concern, those statements are hereby declared to be wickedly and maliciously false. The American Ordnance Company are in no sense directly or indirectly a trust corporation."

The defense of the Driggs-Seabury Company was based upon modifications in the specifications which, it was said, had been made by the ordnance officers, and also because of requirements calling for materials embracing conflicting and irreconcilable qualities. After hearing both sides of the case, Secretary Alger decided that the default of the Driggs-Seabury Company on the first contract should not operate as a bar to their securing another contract, but stated that the action of the Department in letting the second contract should not be construed as a waiver of any of the accrued penalties.

Shortly after this decision Secretary Alger resigned

his portfolio and was succeeded by Mr. Root, to whom an application was made by the Driggs-Seabury Company to receive payment for certain material delivered, though the same was not in the form of the units—gun, mount and ammunition—called for by the contract. The American Ordnance Company protested against such payment and a hearing was granted, after which the Secretary of War decided that payment could be made for parts of units, with the distinct understanding, however, that the Government's right to collect penalties should not be affected thereby. These penalties on the first contract referred to amounted to about \$258,000 at the time Secretary Alger's action was taken, and the Department calculates that additional penalties of about \$150,000 have since accrued on the second contract, upon which the Driggs-Seabury Company are also in default.

Selling to Other Customers.

With a view to assisting the contractors an application was granted by the Secretary of War to use certain heavy presses located at the Frankfort arsenal for the drawing of cartridge cases for ammunition for the guns contracted for, the Driggs-Seabury Company not having the necessary equipment to do this work. Recently, the War Department officials received information that, although in arrears to the Government on their contracts the Driggs-Seabury Company had sold and delivered to the Government of the United States of Colombia several 6-pounder guns and 2000 rounds of ammunition of a type identical with that called for by the company's contracts with the War Department. In addition, it was said that other guns and ammunition were to be furnished for the equipment of a remodeled yacht which the Colombian Government acquired a short time ago. This information caused Secretary Root to address a letter to the Driggs-Seabury Company, in which he commented with much severity upon the company's action in selling to other customers material due the United States, and especially in taking advantage of the Department's permission to use Government machinery to manufacture material for other parties.

The Secretary stated that under a contract dated in April, 1898, the company were now in default by the non-delivery of 2000 rounds of ammunition for 6-pounder guns, all of which by the terms of the contract should have been delivered by August 27, 1898, and by the non-delivery of 5000 rounds called for by a supplemental order. For the purpose of enabling the company to perform their contract, which the Secretary stated "they appeared otherwise unable to perform," and to enable the Government to get the desired ammunition, permission was given them to use the large press at the Frankfort arsenal for the purpose of drawing the ammunition cases to be furnished under the contract. The Secretary was informed, he said, that the ammunition amounting to 2000 rounds, delivered to the Colombian Government, was contained in cases manufactured by the company by the use of this press, which, he said, the contractors had "no right to use for any other purpose than for filling your contract with the United States Government." Further, the Secretary said, the company had no right to use their plant and machinery for the manufacture of guns and ammunition for other customers, leaving their contract with the United States Government unfilled, and the violation of their obligation appeared to be "all the more flagrant" because of the fact that on July 8, 1899, a further contract was secured from the War Department for 40 6-pounder and 40 15-pounder rapid fire guns, all of which should have been delivered by August 1, 1900, and none of which had as yet been delivered. The Secretary closed his letter with peremptory notice to the contractors to give reasons within one week why the Government should not supply the deficiency under existing contracts in open market or to declare the contracts null and void.

The Driggs-Seabury Company's Defense.

The Driggs-Seabury Company, replying to Secretary Root's letter, stated that their failure to deliver the ammunition referred to was because of changes made by the Ordnance Department in the quality of powder required. As to the statement that they had drawn cartridge cases at the Frankfort arsenal for the Colombian Government, they said that having paid all expenses of running the plant and paying for all material employed, they thought the product was their property until the Ordnance Department had received and paid for it. The reply further stated that they believed they had a right to sell the cartridge cases for cash, which they could not get from the War Department, inasmuch as they could replace them before they could procure the powder to meet the Ordnance Bureau's requirement. As to the 6-pounders sold to the Colombian Government the company said they were not manufactured for the War Department but for the Navy, and that they had the consent of the Chief of the Navy Ordnance Bureau to dispose of them to the Colombian Government.

The contractors' statement as to the guns having been designed for the Navy rather than the Army is said at the War Department to have a probable basis in fact, except that it is understood the tubes were forged for the War Department and subsequently diverted to make a delivery to the Navy Department. On receipt of the contractors' reply, Secretary Root referred the case to General Buffington, Chief of the War Ordnance Bureau, for a report, which has since been made and which is unfavorable to the contractors. The case now comes before Secretary Root in connection with an important decision recently rendered by the Comptroller of the Treasury, who is the chief accounting officer of the United States, which in effect is as follows:

The Power to Rescind or Alter Contracts.

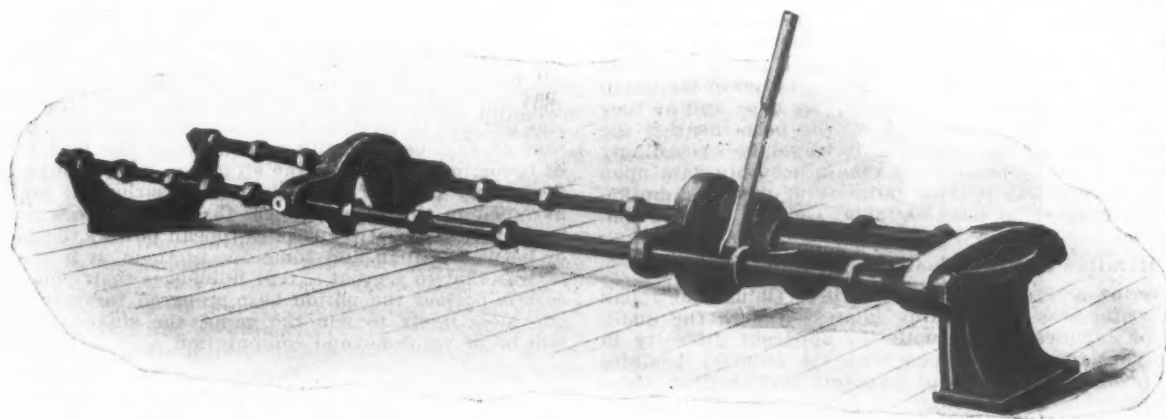
"The power vested in the head of an executive department to make contracts for work or material does not imply the power to rescind or alter such when made unless the change is for the benefit of the Government. There are two conditions precedent necessary to authorize the modification of a written contract—to wit: 1. A new and valuable consideration; 2. That it must be done before breach of the contract. The essential question is whether the modification was of disadvantage to the United States, or an unnecessary surrender of any substantial rights of the United States. If so, no officer of the Government without express authority from Congress has the right to make the modification against the interests of the Government. A contract may be extended as to time—i. e., provided so as to relieve the contractor of penalties or damages—only when such modification is for the interest of the Government, and being

A Simple Home Made Wheel Press.

The accompanying engraving shows a simple and efficient wheel press built by Beaman & Smith of Providence, R. I., for use in their own works. The two side rods are held in a cast frame at each end. At one end is placed an ordinary jack having a stroke of 10 inches. The side rods are threaded between the jack and the opposite end to receive nuts arranged in pairs. Resting on the bars and bearing against any desired pair of nuts is the yoke, which forms a support for the work. The nuts are placed about the same distance apart as the stroke of the ram, several pairs being used in order to save time in adjusting the machine for work of different sizes.

Our Population.

The total population of the United States is 76,295,220, according to a Census Bureau bulletin issued this week. This is an increase of 13,225,464 over the enumeration of 1890. The percentage of increase is 20.90. The figures are in excess of the estimates made by competent observers, which ranged from 70,000,000 to 75,000,000. It is the largest actual increase occurring during any decade since the first census in 1790, when the population of the nation was 3,929,214. The growth from that modest figure to over 76,000,000 in a little over a century is one of the marvels of our remarkable country. It is a record unparalleled in the history of the world. One hundred years ago Russia stood at the head, in point of population, of the civilized countries of the



A SIMPLE HOME MADE WHEEL PRESS.

based upon a new and valuable consideration. If an extension of time be granted solely for the benefit of the contractor without any new consideration accruing to the Government such extension will not relieve the contractor of his obligation to pay any penalties or damages provided for in the original contract. As time is usually an important element considered by bidders in fixing the price for a piece of work, it is fair to presume that bidders name a higher price for completing work covered by a given contract than would be named were it understood that a longer time would be granted the successful bidder. To give such successful bidder additional time after the award has been made, and without adequate consideration, is an undue advantage in favor of the successful bidder, if not an actual fraud upon the other bidders."

In view of the foregoing, Secretary Root will undertake to decide: 1. Whether the Driggs-Seabury Company have forfeited their contract by reason of their action in making deliveries to the Colombian Government while in default upon their orders from the War Department; and 2, whether the Department has authority to grant extensions upon existing contracts without "a new and valuable consideration," and after "the breach of the contract." As this latter question, especially, is of great interest to all contractors, the Secretary's action will be awaited with much interest.

W. L. C.

Edw. O. Miles & Co., 278-298 Marietta street, Atlanta, Ga., announce the change in the name of their business as dealers in scrap iron and old metals to that of the Atlanta Junk Company, and that they have also bought out the Fulton Junk & Paper Company. Jno. W. Russey, the former main owner and manager of the purchased company, is to be retained as manager of the junk department of the new firm.

western world, while the United States took lowest rank. At the end of the century Russia remains in the same position, while the United States has risen to the second place. But if the advance in material well being and industrial achievements of the people is taken into consideration, it will be found that this country has forged ahead into the first place by a long interval. Taking the population of the country by States, it is shown that New York stands easily at the head, with a population of 7,268,000, Pennsylvania coming second with 6,301,365 inhabitants, Illinois third with 4,821,550, Ohio fourth with 4,157,545, and Missouri fifth with 3,107,117. These States keep in the order in which they stood ten years ago, but Massachusetts gives up her place as the sixth most populous State in favor of Texas, which has advanced to within 59,000 of Missouri. In the far West, some of the small States show remarkable rates of increase, Idaho's growth being 92 per cent., that of Montana 84 per cent., North Dakota 75 per cent., and Wyoming 53 per cent. On the other hand, Kansas has gained only 3 per cent., and Nebraska 1 per cent., while Nevada shows an actual loss in population. New Jersey makes the best record in the East, with an increase of 30 per cent., New York's growth being 21 per cent., and Pennsylvania's 20 per cent. The New England States have made comparatively little advance. In the South, Florida has grown 35 per cent. in population, while Mississippi, Georgia and Alabama have each gained about 20 per cent. The other Southern States fall far behind these figures. Illinois and Wisconsin, in the Middle West, have increased 23 per cent., Iowa 17 per cent., Indiana 15 per cent., and Ohio only 13 per cent.

According to reports from the Straits Settlements several reefs with payable gold have been discovered in Burmah.

The Fuel Problem of China and the Far East.

BY F. LYNWOOD GARRISON, PHILADELPHIA, PA.

Since the existence of reasonably cheap fuel is necessary to the maintenance of modern commercial and manufacturing enterprises, it is evident that this question must be carefully studied before an accurate idea may be obtained of the industrial possibilities of China.

It is well known that the coal fields of China are extensive, but it is difficult to appreciate their vast size and the extraordinary fact that with but one exception not an operating colliery exists in Chinese territory. This exception is the Kaiping mine in the province of Chihli, which is connected with Tientsin and Taku by railway. These mines produce an excellent coking coal, containing on an average not over 7 per cent. ash, whereas the Japanese coal carries as much as 20 per cent.

Numerous native diggings exist all over the coal areas of China, but although their output in the aggregate may be considerable, they are of the most primitive character, being simply narrow drifts or pits driven into the hill sides, in which operations are suspended when the water level is reached. They are of no commercial importance and supply only a limited local demand. It is a curious fact that the very steamers carrying the enormous commerce of the Yangtse Valley use imported coal to propel them up and down a river whose course for hundreds of miles runs through great coal fields.

Imports of Coal.

The imports of coal into China in 1899 amounted to 859,370 tons, valued at 5,396,671 taels, or 4,669,569 gold dollars. Of this amount 610,564 tons went to the port of Shanghai. The imports in 1898 were 730,606, thus giving an increase for 1899 of 128,764 tons. The quantity of Chinese coal produced it is impossible to determine, but it was probably not over 500,000 tons in 1899, and of this amount 112,245 tons of Kaiping coal was brought to Shanghai. Most of the coal used in the coasting trade and foreign steamers is Japanese, and as they all aim to supply themselves at the ports nearest the mines, Nagasaki for instance, it would be exceedingly difficult, if not impossible, to obtain accurate data upon which to base any reliable estimate of the consumption for this purpose, at least as far as Chinese trade is concerned.

Relative Cost of Imported and Domestic Coal.

During a recent protracted visit to China and Japan the writer was unfavorably impressed with the qualities of Japanese coals, with the apparent difficulty in supplying the demand, and with the clumsy, wasteful and primitive methods of handling and coaling ships at Nagasaki. The average wholesale price of Japanese coal in Shanghai last winter and spring was between six and seven taels (\$4.40 to \$5.10 gold) per ton; it is now probably somewhat higher. It is certain that bituminous coal from Central China can be delivered at Shanghai for less than 2 taels per ton (about \$1.50 gold) and anthracite from the Yangtse Valley at 2 to 3 taels (\$1.50 to \$2.20). The writer believes this estimate to be well within bounds, if indeed it could not be reduced 50 per cent. Though no deep level mining has been done in Central China and as coal from near the surface is seldom as good as that lower down, the writer has seen and analyzed a number of samples of excellent coals from the lower Yangtse Valley and adjacent districts. These coals were both anthracite and bituminous, the former running as low as 2½ per cent. of ash and in other respects quite as good as similar coal from Pennsylvania; the bituminous is both coking and non-coking, and between the two classes a variety that may be considered as semianthracite, containing as much as 10 per cent of ash.

Anthracite Coal.

It is likely that the aggregate area of the anthracite coal fields in China is the largest in the world, while the bituminous fields, if not equal in extent to those of the United States, cannot be far short both in area and variety. It may not be generally known that anthracite coal is, with the exception of petroleum and natural gas, the best mineral fuel in the world; it gives intense heat, no smoke, and can be used in its raw state (bituminous coal must first be converted into coke) for the manufacture of pig iron. It is better adapted than any other coal for the generation of both fuel and illuminating gas; in short, as we well know in Eastern Pennsylvania, it is the king of coals!

Natural Gas and Petroleum.

In the great and rich province of Szechuen natural gas is found and largely used in the evaporation of brine at the salt wells. As both brine and natural gas are usually found accompanying or at least near by the petroleum deposits of Pennsylvania and elsewhere, we

may naturally expect to find petroleum in Szechuen, and doubtless it will be, when once a systematic search is made with this end in view.* It is evident that China is bountifully supplied with mineral riches, not so much in ephemeral and uncertain gold and silver deposits as in good substantial coal and iron resources, which, when rightly used, are sure to make a nation great and strong. Copper, lead, mercury, antimony and zinc are found in numerous localities throughout the Empire, but as yet the extent and value of this class of mineral wealth is undeveloped and unknown; there is good reason, however, for supposing that some of the deposits are extensive and valuable.

Local Consumption of Coal.

In the statistics given above of the coal consumption and imports, Hong Kong is not included, as it is British territory, but it should nevertheless be considered with China economically if not politically. In Shanghai, as in Hong Kong, there are a number of large dock yards capable of constructing ocean steamers, also cotton and silk mills, and a variety and extent of modern industries that are a surprise to most visitors. Such establishments are certain to spread over China and bring with them a steady and ever increasing demand for coal and iron. The total foreign trade (not including Hong Kong, but China proper) in 1890 amounted to 214,237,961 Halkwan taels (a tael equals 73 cents gold), in 1898, 368,616,483, and in 1899, 460,533,288 taels, an increase over 1890 of about 115 per cent and over 1898 of 25 per cent. It is thus plain that China's foreign trade is increasing in leaps and bounds, and that she offers at present the greatest opportunities in the world to foreign enterprise and energy.

Political Aspects of the Problem.

It is interesting in this connection to consider the aspect of the coal problem in the far East as it bears upon the political conditions as they now exist in relation to the foreign powers. It may be assumed, to begin with, that the possession of an unlimited coal supply is a *sine qua non* in modern naval warfare, and that the nation or nations controlling such stand the best chance of becoming masters of the situation, even though their fleets may be inferior to their adversaries. It must be assumed in the second place that if war does not actually break out between the European powers themselves or between Japan and some one of them, it is the fear of war that to a great extent influences their policy and *ceteris paribus* the nation best prepared for war is the one most likely to win the game, the stakes of which will be of value beyond computation.

Japan.

All things considered, the Japanese occupy the best strategic position in the far East, their sea-girt empire stands in the same geographical relation to China that England does to Continental Europe, and as it possesses an energetic population with relatively large resources of coal and iron, the similarity is even more pronounced. Whatever may be the condition in years to come, Japan is not at present in a position to assert her power. She is a poor country. Her people have recently emerged from a condition of what may be called mediæval civilization, and their veneer of Western culture and progress is exceedingly thin. No engineer who has observed their mechanical adaptations can fail to note their lack of inventive power; the genius is not yet in the race. Their plumes are borrowed. The writer would be no true friend of these interesting and charming people if he failed to warn them not to trust over much in their new civilization. Human nature is much the same now as since the world began, and history shows us that nations cannot be metamorphosed in a day.

Japanese Coal Fields.

In common with her other mineral resources, the extent of the productive coal fields in Japan does not appear to have been very definitely determined. At present it is composed of a well developed area in the west and northwest section of Kyushu, in Southern Japan, and a large but ill defined area in Hokkaido (Yesso). The island of Kyushu supplies about 90 per cent. of the total yield. The coals of this area belong to the tertiary, not to the carboniferous formation, and are, as a rule, inferior in every way to the real carboniferous coal. The Hokkaido coal fields are true tertiary and the true carboniferous rocks of Japan on the whole are barren of coal. A great majority of the producing mines are in the southern districts, and in the neighborhood of Nagasaki. As we have already observed, this coal is not

* As a matter of fact petroleum does occur in the deeper wells of from 1000 to 3000 feet deep. Richtofen mentions it in his report to the Shanghai Chamber of Commerce. The Jesuit missionary Abbé Hue, who traveled through the province of Szechuen fifty years or more ago, speaks of a "bituminous oil," associated in these wells with the brine. (See "A Journey through the Chinese Empire" [page 303].—Harper & Bros. New York. 1855.)

first-class, it is high in ash, friable, dirty and sulphurous; its evaporating power per unit of coal is about 7 units of water, as compared with 12 units of water for the best Welsh coal.

The total production of Japan in 1888 was 200,000 tons, and in 1897 6,000,000 tons. Prices have increased during the same period 130 per cent. Of the total production of 1897 3,500,000 tons were exported.

Russia.

Russia, the most aggressive and cunning power in the East, possesses coal fields in the Island of Sakhalin which are extensive and, it is said, of good quality. In addition to this petroleum is found on the same island which resembles the Caucasian in quality. Colquhoun states that the present annual output of Sakhalin coal exceeds 25,000 tons and is equal to Welsh coal. According to Japanese reports, however, these coals belong to the tertiary period, hence it is likely they are no better than the Japanese coals of Kyushu. In Manchuria, now Russian territory, there are large coal fields, but as this great, and, from all accounts, very fine country of about 390,000 square miles is but little known, it is not possible to say much of their value. The best areas appear to be in the Liao-tung peninsula and on the adjacent islands.

The writer recently met in China a Russian engineer who was employed in opening up coal mines along the line of the Siberian Railway in Manchuria. He stated that the coal was excellent, and in great abundance. It is evident that Russia has in Manchuria a possession of the greatest value and importance!

Germany.

Some years ago a well known German geographer and geologist, Baron von Richthofen, made extended reconnaissances into the province of Shantung for the purpose of determining its mineral wealth and other resources. He found that the province, which covers some 65,100 square miles, contains coal fields that are likely to become of the highest value and importance. The coal found near the surface was fairly good, and the locations were relatively near the seaboard. He appears to have been especially impressed by the excellence of the Poshan field in Central Shantung, about 100 miles northwest of the excellent harbor of Kiau-chao. As Richthofen's reports were extensively published in Germany, there can be no doubt that his Government has long cherished the desire of obtaining foothold in Shantung and seized the first pretext for so doing. In occupying Kiau-chao Bay and its adjacent territory, Germany stole—for it was nothing else than a theft—not only a fine harbor, but a strategic position that commands what may prove the best coal fields in Northern China. This fine naval base is the only territorial possession Germany has in the far East (omitting the Caroline Islands as of little importance), but since she claims or is about to claim, the whole of Shantung, it is evident that her aggressive policy is being carried out with great intelligence and that the mineral wealth of this province will be developed by her with characteristic skill and energy.

France.

The French in Tongking have some excellent coal in the Hongay field. The extent of the area is unknown; it runs parallel with the middle portion of the Song-koi (Red) River. In some localities the coal is obtained by "stripping"—that is, without underground work. Most of it is anthracite of good quality and the whole area belongs probably to the true carboniferous formation. The French appear to be very apathetic in the development of the resources of their colonies, for although the existence of these superior coal fields has been known for a number of years, little is done to develop them. Some of the Hongay anthracite finds its way into the Shanghai and doubtless also Hong Kong and Singapore markets.

Great Britain.

England, who has by far the largest interests in the East, controls absolutely no coal fields in China. To be sure some inferior coal occurs in India, but it is either so lacking in quality or quantity that it appears never to have been a factor in Asiatic trade. In China, therefore, her nearest supply is at Vancouver and home ports, and in case of war her naval stations must be supplied from these distant places. It is true she has a line of unequalled fortresses from Gibraltar to Hong Kong, but they must all be supplied with fuel from over sea.

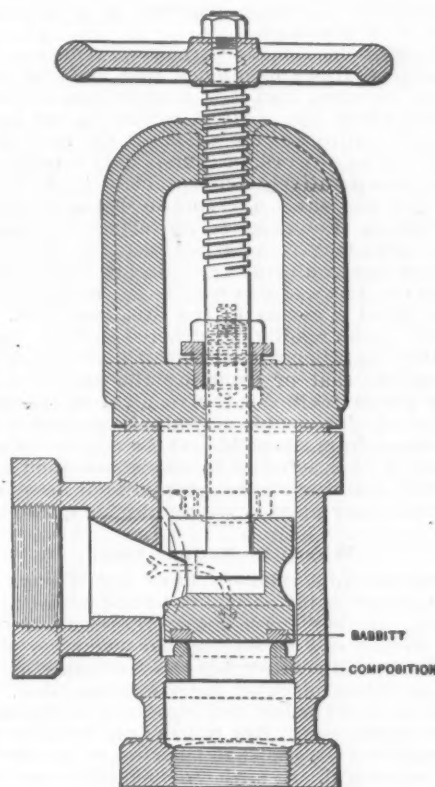
Two or three years ago a company were formed in Shanghai with the purpose of exploring for coal in the British concession of Wei-hai-wei, at the extremity of the Shantung peninsula, it having been reported that coal existed there. During the month of May, 1900, the writer examined this district, only to find that the geological formation of practically the whole concession is such that there never can be the remotest chance of

finding coal or any other mineral fuel. It is evident that this company have been badly advised and are out of pocket a considerable sum of money. Gold is found pretty generally throughout eastern Shantung, but in such small quantity, and so widely distributed, it will perhaps never pay to work even with cheap Chinese labor. If Great Britain means to keep her place and trade in China, she must either insist upon maintaining the integrity of the Empire, or else take possession of the Yangtse Valley and its splendid coal fields. This, the very heart of China, is probably the richest section in coal and iron.

United States.

The exigencies of American politics and policies are such that it is difficult to determine what may be the future position of the United States in China. The value of American trade in 1899 was next largest to that of Great Britain and her dependencies, and our trade surpasses that of Russia, Germany, France and even Japan. To protect these great interests we have naval stations (unfortified, to be sure) at the Hawaiian Islands, Samoa, Guam and the Philippines, but as no coal is produced at any of these places, our fleets would have to rely upon exotic stores of fuel accumulated at these points. In this respect we are worse off than England, since all her stations are fortified except Wei-hai-wei.

It remains in conclusion but to point out that on the fuel question Japan, of all the powers, is at present the



THE KELLY & JONES BLOW OFF VALVE.

most advantageously situated, but she lacks the sinews of war. The Eastern coal fields now in the control of Russia, France and Germany are but slightly developed, and, in the case of Germany, not connected by railway with the seaboard. It is, therefore, evident that England is yet the master of the situation if she exerts her might, which it is to be earnestly hoped she will, in favor of the integrity of the Chinese Empire, the "open door," or free trade for all.

The Kelly & Jones Blow Off Valve.

The blow off valve here illustrated is manufactured by the Kelly & Jones Company of Greensburg, Pa. The principle underlying its construction will be understood from the sectional view. The boiler pressure is always exerted on top of the piston, which is fitted to slide in the body. When the valve is opened to blow off the boiler it is impossible for muddy water carrying scale to pass out until the piston has been raised a sufficient distance from its seat to prevent the cutting of the latter by any grit there may be in the water. It will be seen that before the passage is opened the piston must be raised a short distance from its seat.

Machine Molding.

The following paper was read at the meeting of the Foundrymen's Association, Philadelphia, on Wednesday evening, 7th inst., by I. L. McCord, secretary of the Maywood Foundry & Machine Company, Maywood, Ill.:

We are all more or less familiar with the various types of molding machines that are now being offered on the market, and many of us are familiar with machines that have had their day and been discarded. It is not always a question of installing a machine that will do a given work. What we are most interested in is machines best adapted to the individual requirements of our foundries. In other words, we want to know what machines will enable us to produce the best quality of castings at the least cost, and at the same time place us in the most independent position with respect to labor.

In order to consider the application of molding machines to foundry work, let us analyze the work of molding into the following five principal operations:

1. Getting the flask, pattern and match board together and putting in the sand.
2. Ramming or compressing the sand.
3. Removing the pattern from the sand.
4. Placing the mold on the floor.
5. Pouring the melted iron into the molds.

Of course in addition to these five operations is the riddling of sand, the application of facing to the molds, shaking out, &c., which for the present we will assume to be practically the same, whether the molds are made by hand or on machines.

It is principally for the purpose of reducing the cost of the five operations mentioned that molding machines have been invented, and it is obvious that the machine which will effect the greatest saving in the aggregate during these entire five operations is the most desirable machine, quality of work, of course, duly considered.

It is a comparatively easy problem to devise a machine which will effect a saving in one or two of these five operations. For example, on certain classes of light work patterns may be attached to metal match plates, so that they are at all times together in convenient form to set into the flasks, which may be stacked near at hand, and thus effect a saving in the first operation. Again, a machine can be readily constructed so that, regardless of the other operations, it will effect a saving in the second operation, that of ramming the sand. Likewise stripping plates facilitate the removal of the patterns from the sand. The molds may also be conveyed in some manner direct from the molder to the cupola for pouring, and a saving thus effected in operations four and five. But to effect a saving at one point without increasing the cost at some other point is the perplexing question.

Where to Reduce Cost.

Molding machine makers have not always agreed upon the proper point at which to undertake to reduce cost. Some of them have taken the position that the greatest saving can be effected by ramming the sand automatically and rearranging the remaining operations to accommodate a machine for power ramming. Others have gone a step further and combined stripping plates with power rammers. But it has only been on certain special classes of work that such machines have been entirely successful. It must be admitted that there is some work where the ramming of the sand is the biggest part of the job, but aside from very light work or very heavy work it will be found ordinarily that the drawing of the pattern and the work incidental thereto consumes by far the greater portion of time, besides requiring the greatest amount of skill.

A few years ago I visited one of the leading foundries in Philadelphia and recommended a stripping plate molding machine for large gear wheels, on which this foundry runs one or two floors pretty much the year around. During my interview with the proprietor and foundry superintendent they challenged my statement that the machine which "merely drew the pattern" would enable two men to put up 40 of these gears per day, against 12 which a molder and helper were putting up at that time. To prove the point we went into the foundry and timed the men, finding that it took 35 minutes to complete a mold; exactly seven minutes of which time was consumed in shoveling sand into the flask and ramming up the mold; the remainder of the time was expended in drawing the pattern, patching and slicking the mold, &c., showing that in this particular instance the handling of the sand and the ramming consumed about one-fifth of the entire time spent on the mold. This was perhaps an exceptional case, because the gear was rather a difficult pattern to draw without breaking the corners of the mold, but it serves to call attention to the fact that foundrymen may be unaware of the precise conditions regarding a given pattern unless they have made a careful investigation and noted the various stages of the

work incidental to molding. On the gear in question, if 75 per cent. of the labor of ramming the mold could have been saved, it would only have saved 15 per cent. of the total cost of molding the gear.

Early Power Ramming Machines.

The first successful molding machines introduced into this country embodied the simple stripping plate principle. It is true they were crudely constructed and designed to receive only the simplest of patterns, but the stripping plate principle began to be recognized as the best means of securing a clean, clear cut mold, although the lack of experience in the preparation of the special patterns required for such machines prevented a very general introduction of these machines throughout the country. Some of the larger foundries built and installed these simple machines and immediately began to devise some scheme for pressing the sand into the flasks. From that moment development of machine molding along practical and simple lines received a severe set back. Several prominent manufacturers put upon the market about the same time large steam actuated or pneumatic machines, and in fact the poor little simple stripping plate machine was entirely forgotten in the efforts of these manufacturers to construct machines designed to entirely dispense with molders. No doubt most of the gentlemen present whose experience dates back 15 years will recall one or two of these systems with which their sponsors proposed to revolutionize foundry methods. At that time the power ramming molding machines had reached their zenith and the audacious claims made for these machines were only equaled by the complacency with which their manufacturers demanded fortunes for installing them. Many of the large agricultural implement concerns installed these systems, comprising large power ramming molding machines in connection with conveyors for automatically handling the sand and flask to and from the machines. Ingenious platens were devised to insure uniformity in ramming, and withal these systems were most elaborate and complete. You remember them? To-day these machines are scarcely ever seen except now and then in an antiquated foundry, where they give testimony to the utter failure of a beautiful theory. Many of the same foundries that installed the systems mentioned went back to the simple machines, and are now using stripping plate hand ramming machines, which enable them to turn out a far greater tonnage to the number of men employed than they could possibly have done or did do with their power ramming machines.

Edgar Penney, general superintendent of Frick & Co.'s large works, at Waynesborough, Pa., discussed before the twenty-first meeting of the American Society of Mechanical Engineers, held in Cincinnati in May, 1890, his experience with what was probably one of the best power ramming molding machines of the day, wherein the patterns were divided in halves and placed on either side of an iron plate, the flasks being provided with trunnions. In operation the plate was clamped between the two parts of the flask, the whole being placed on a counterbalance platen with the cope side up. The sand was shoveled into the cope and the top platen forced down against the mold by mechanical means. Upon raising the top platen and also the flask on its trunnions by means of a foot lever, the mold was turned over by its own gravity, the operation being repeated on the drag part of the flask, and the mold then passed to a molder, who separated the two parts of the flask, removed the plate with its patterns, closed the mold and passed it on to be deposited either on the floor or on a conveyor which carried it past the cupola for pouring. Withal this machine appeared to be exceedingly simple and rapid of operation, and undoubtedly accomplished in a satisfactory manner the purpose for which it was intended—namely, ramming the sand. In comparing results obtained from this machine with hand work, it appears that a molder and a boy put up 33 snap flasks per day on the bench. With the machine one man and two boys put up 168 molds. The entire saving thus effected was directly attributed to ramming the sand on this machine. Nothing was said by Mr. Penney of the cost of bringing the sand up to this machine or the cost of taking the sand away from the machine and depositing it on the floor, and nothing is said of the amount of skill required on the part of the man who removed the plate and pattern from the mold. We could show you hundreds of cases where a much greater output has been reached by simple hand ramming stripping plate machines, which do not require the sand to be brought to them, and in fact require no extra handling of sand and flasks beyond what would be necessarily required if the molding were done by hand.

I know of a malleable iron foundry making railroad draw bars on a machine with a large revolving table for conveying the molds around to a convenient point for pouring, and with power ramming devices for compressing the sand. This foundry has accurately figured that it

costs them just 2 cents apiece more to mold their draw bars on this machine than it costs to mold the same draw bars on the floor by hand, and their only apparent reason for continuing to operate the machines is to get more uniform castings. Whether the machine accomplishes this result in a satisfactory manner I have been unable to ascertain.

Hand Ramming Stripping Plate Machines.

I know of a foundry making railroad brake shoes on a well-known type of molding machines, wherein the machines draw the patterns through stripping plates, and the molds are rammed at one stroke by compressed air. This foundry is about 75 feet wide, and the molding machines are arranged in a row about 15 feet from one side of the building. In operation two men work at the machines while one man works on the floor setting cores and inserts and closes the molds. The floors are started near the opposite side of the foundry from the machines, and the first molds are carried by the machine operators a distance of nearly 60 feet. As a result of the time consumed in carrying the molds away from the machines this force of three men in ten hours' continuous operation are able to place on the floor 330 molds, or 110 molds per man. This same foundry installed some hand ramming stripping plate machines a few years ago, fitting up for them precisely the same patterns as those on the pneumatic machines. The hand ramming machines were operated by two men, who were able in ten hours' continuous operation to place on the floor 225 molds. It will be seen, therefore, that practically the same output was obtained from the hand ramming machine per man as from the pneumatic machine. The castings made on the hand ramming machines, however, were cheaper, because the pneumatic machines consumed a considerable amount of compressed air, and also required a considerable amount of repairs for the reason that the enormous pressure required to ram the molds on the machines racked them to pieces very rapidly.

There is a foundry near Cleveland in which large quantities of drop hangers are made, some on pneumatic machines and others on hand ramming stripping plate machines, and this foundry has figured that the same output practically can be obtained from the hand machines as from the pneumatic machines. I know of one or two other foundries making drop hangers, boxes and similar work that have discarded pneumatic machines and installed hand ramming machines.

One of the large manufacturers of pipe fittings in Chicago has in use a very elaborate system of machines and conveyors which for their particular class of work has proven quite successful, yet these people have for some time been investigating other systems, and it is a question whether they are now producing their castings at a less cost than others who are equipped with ordinary stripping plate molding machines.

There is a foundry near Pittsburgh which has had in operation for a number of years a very complete system of machine molding, a system which has been looked up to by founders everywhere as a model of its kind. Yet the general manager of this company recently assured me that if they were now for the first time putting in molding machines for their work they would probably not install a system such as they at present operate.

Of course it may be argued that the particular instances herein cited do not fairly condemn power ramming machines, since there may have been especial conditions which in the arrangement of the machines and their operation prevented the attainment of the best results. But it should be borne in mind that the conditions in these foundries under which the power ramming machines were operated were precisely the same as the conditions surrounding the hand ramming stripping plate machines. We do not contend that power ramming machines are a failure in all respects. A great many foundries are using them to-day, and producing large quantities of castings of good quality, and at a less cost than the same castings could be produced by hand. But we have yet to find a single foundry that is producing castings as cheaply on power ramming machines as the same castings can be produced on hand machines. We submit, therefore, that in the face of such testimony we are justified in claiming the superiority for the hand ramming stripping plate machines. We are giving you not alone our views, but the experience and judgment of those who have made a careful and thorough study of machine molding for years.

Disadvantages of Power Ramming Machines.

A power ramming machine must of necessity remain in one position, or on one fixed foundation. Therefore, without some accompanying scheme for handling the molds to and from it, the machine will frequently cost more to operate than it will save in the one operation of ramming the sand. It is, of course, a very difficult matter to arrive with any degree of accuracy at the amount of the increased handling of sand and flasks which may

be properly chargeable to the machine, especially where several machines are being operated at the same time and are turning out different kinds of castings. However, it is a pretty safe proposition that it costs more to move a ton of sand a given distance than it does to move a ton of iron, no matter whether it is wheeled in a wheelbarrow, carried on the back or conveyed by automatic carriers. It certainly costs very much more to move sand and flasks from the floor to the machines and back again in the form of molds to the floor or cupola for pouring than it does to move the machines along with the work and convey iron one time from the cupola to the floor.

Another point upon which we believe the makers of power ramming machines are pursuing the wrong track is in their endeavors to secure uniform ramming of the molds. If we have a machine that will successfully ram the sand in a mold uniformly we have a machine which is limited in its uses, because there are only certain patterns with which the best results can be obtained by equal pressure. It is not uniformity that we need. The unequal pressure of the fluid iron against the walls of the mold, the irregular surface of the casting, and the varied thickness of the different sections of the casting, the iron setting much more rapidly in some sections than others, and requiring less density of the sand to admit of the free and rapid escape of gases, are one and all conditions which must be met by the exercise of a molder's knowledge. These are some of the very things which a molder must master before he becomes proficient at his trade. We claim, however, that the hand ramming stripping plate machine may be adapted to any pattern which it is possible to mold by hand, because the machine permits the exercise of the same degree of intelligence that is necessary in making molds by hand. We do not mean by this that the stripping plate machine requires at all times a competent molder to operate it. The stripping plate machine goes further. It enables men of ordinary intelligence to very quickly acquire the amount of skill which is necessary to make molds. The utility of the hand ramming stripping plate machines lies in the great flexibility of the system. There is practically no limit to the range of work which can be made on such machines, and the limit is only reached when ingenuity is no longer able to devise a scheme for attaching the patterns.

The Initial Cost of Stripping Plate Machines.

One great objection that has been raised to stripping plate molding machines has been on account of the initial cost of the patterns and stripping plates. These cost money, as we all know, but since they have proven to be better and to enable the production of better castings and cheaper castings, the first cost ought to be compared with the results. We do not believe that a machine of any kind can be too good. You might install a traveling crane in your foundry and save a great deal of the initial cost by omitting one of its motors and arranging to haul it back and forth in your foundry with a cable and a team of horses, but you will not think of doing such an absurd and idiotic thing. If your work requires the addition of a traveling crane you want the most modern tool that you can buy with the highest practical speed and greatest reliability and \$500 or \$1000 in the original cost will not prevent you from having it. From this same standpoint, if you have quantities of castings that are duplicated to an extent to require molding machines at all, you cannot afford to operate any other than the best machines your money can buy. If your castings do not run into sufficient quantities to warrant the expense of stripping plates then from an economical standpoint you had better make them on the bench or floor.

Manning the Machines.

I have seen instances where satisfactory results have not been obtained from stripping plate hand ramming machines, and it was usually not difficult to trace the cause of failure to its true source. I recall one instance where a set of machines went into a foundry, and about four weeks thereafter the superintendent reported that he had been unable to make much progress with the machines, and in fact could not begin to turn out the amount of work that had been represented. Upon investigation it developed that the first week the foreman had placed two men on the machines, whose only experience around the foundry had been unloading pig iron and wheeling sand. The result, that might have been expected, was that about 50 per cent. of their work had to be scrapped.

The next men put at the machine did but little better, and then the foreman related how in desperation he had "finally put the best molder he had in the shop" at the machines, and while this molder had done excellent work, he had failed to put up any more flasks on the machine than he could have done by hand. Here we have had a complete explanation of that foreman's failure to make a success with his machines. Green men should always be under the direct and careful supervision of the fore-

man personally until they learn their job. It will not do to leave them to the tender mercies of their own ignorance nor to the wily persuasion of the molder who may be working on the next floor. Our experience has taught that the best men to put at molding machines are helpers who have some knowledge in a general way of foundry work, and who are endowed with sufficient intelligence and memory to do precisely as instructed. They should have minds of their own, and they should appreciate that it is a promotion for them to be put at the machine. Doing a general jobbing business there are times when we have no orders running into quantities. At such times we use our machine operators at ordinary laboring work and pay them \$1.50 per day. When we get an order for a few hundred castings of one kind we fit up the patterns for machines and these men are always ready and waiting for such jobs, and usually ask the foreman in advance if they can have them. When operating the machines the men are able to earn more wages than they otherwise could, as we put them on piece work, and so find that we are seldom bothered about getting men to operate our machines.

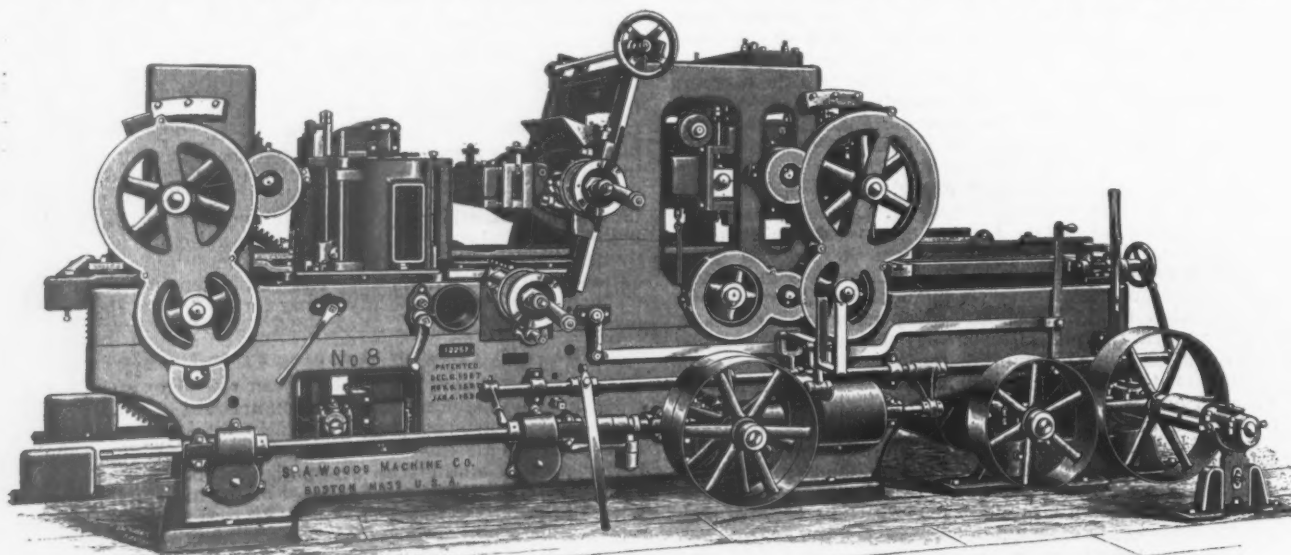
The Quality of Molding Sand.

I have seen some instances where hand ramming, as well as other molding machines, have not been entirely successful on account of the peculiar qualities of molding sand used. It may not be apparent at first thought that sand which might answer the purpose in hand molding would not work equally well on molding machines.

matic sand rammer to be used in connection with our machines, which enables the machine operators to exercise the same degree of intelligence in ramming their molds that they can when using ordinary hand rammers. This rammer combines both butt and pein ends, and in operation can be reversed at pleasure for tucking around the corners of the mold as well as "butting off." This rammer will not only enable the operator to ram up from three to four times the amount of flasks that he could by hand, but it leaves him about as fresh at the end of his day's work as he was at the beginning; since the only energy he is called upon to expend is in guiding the machine and directing and controlling the blow.

The hand ramming stripping plate machine has proven itself to be the best molding machine for all around purposes, and we submit that in connection with the pneumatic sand rammer this equipment represents the highest standard of efficiency as well as the most modern development of machine molding. Of course, all foundries are not equipped with air, but most foundries that make sufficiently large quantities of castings to justify the use of molding machines have compressed air plants.

There are many questions that have been discussed in connection with molding machines, such as the division of labor—that is, having one force of men operate the machine all day, and another gang do the pouring. We believe these are matters that can best be adjusted by foundries individually. In many instances it is no doubt more economical to have a separate gang of men



THE WOODS PLANER AND TIMBER SIZER.

But if you will bear in mind that a molder at the bench or on the floor can roll his flask over, and always lift his pattern up out of the sand, whereas on a molding machine the pattern is usually drawn down, it will be seen that the sand for machine molding ought to have the greatest possible bond. It also sometimes happens that the quality of the sand may be satisfactory and that the tempering and mixing, having been done by the same green and inexperienced men placed upon the machines, is at fault.

Toughness and porosity, the chief requirements of good molding sand, depend equally upon proper mixing and uniform ramming. If the mixing and tempering of sand is left entirely to inexperienced laborers rough castings with uneven surface may result from this source, instead of from the quality of the sand or improper ramming of the mold. Therefore, in order to obtain the best results in machine molding, wherever it is possible mechanical mixers ought to accompany the machines. There are several good sand mixers on the market and they are inexpensive.

The Pneumatic Sand Rammer.

I have mentioned some of the popular objections to hand ramming machines, but there is another and far greater objection that has been raised in almost every foundry that has installed this type of machines. If you will go into foundries like that of the McCormick Reaper Company of Chicago and watch the men at work on hand ramming machines, you will wonder that they are able to stand up to the machines for a whole day and turn out the quantity of work which you see them putting on the floor. It is a fact that the man's job who is unloading pig iron is a sinecure as compared with that of the machine operator. In order to meet this objection to the hand ramming machine we have devised a pneu-

matic sand rammer to be used in connection with our machines, which enables the machine operators to exercise the same degree of intelligence in ramming their molds that they can when using ordinary hand rammers. This rammer combines both butt and pein ends, and in operation can be reversed at pleasure for tucking around the corners of the mold as well as "butting off." This rammer will not only enable the operator to ram up from three to four times the amount of flasks that he could by hand, but it leaves him about as fresh at the end of his day's work as he was at the beginning; since the only energy he is called upon to expend is in guiding the machine and directing and controlling the blow.

As stated, however, we do not believe these are matters which necessarily belong to a discussion of molding machines.

The reading of the paper was followed by a number of lantern views showing molding machines, whose special uses were described.

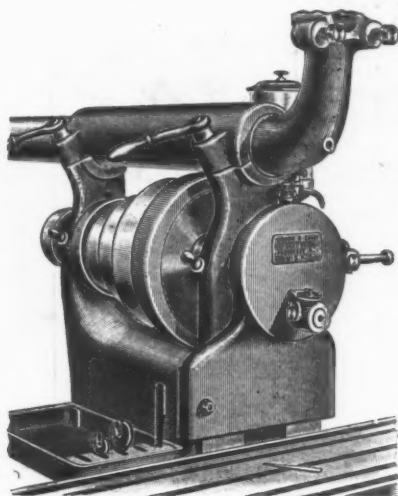
The Woods Planer and Timber Sizer.

The planer and timber sizer built by the S. A. Woods Company of South Boston, Mass., is adapted to a wide range of work, varying from matching boards to squaring timbers up to its full capacity. Among the new features of the machine is the special wedge platen adjustment, by which the bed plate beneath the top cylinder, with the lower carrying in rolls and boxes, may be raised or lowered together and securely clamped, to obtain more

or less cut to the bottom cylinder—such change being easily accomplished from the feeding in end. The advantage of this adjustment will be apparent when it is realized that the surface cut may be distributed at will between the top and bottom cylinders, and without disturbing the cutter heads or rolls, or changing the finished thickness of the lumber. By special arrangement or location of cutter heads on this machine a long, rigid platen is afforded the top and bottom cylinders, insuring superior planing to both surfaces. The bar, after the top cylinder cuts, acts as an overhead platen for the under cylinder, moving with the top cylinder at all times unless special adjustment is required. The machine is provided with power hoist, by which the entire train of rolls and upper cylinder may be adjusted simultaneously, or the top carrying in rolls may be detached and operated simultaneously, when necessary to take an extra heavy cut.

The upper cylinder and yoke may be adjusted independently by hand if desired, and are locked firmly in place by a lever at the feeding in end, which is so placed that the power hoist cannot be operated until the cylinder yoke is released.

All the feed rolls are weighted from below, leaving the upper works entirely free from overhead weights or springs. Both surface and side head chip breakers, and also the pressure bars, are provided with sufficient expansion to permit of swinging overhanging cutters. Square jointer or matcher heads may be used on the side spindles, the matcher heads being provided with vertical adjustment, notwithstanding that the spindles are equipped with top bearings of heavy and efficient character. Accessibility is facilitated by the manner in which the chip breakers and spouts are hung, that permit of swinging to one side; piping to exhaust is also facilitated by the location of these works. The side head frames are clamped into place by a locking device, and are so



Attachment in Place

THE BROWN & SHARPE HIGH SPEED MILLING ATTACHMENT.

hung that they may be readily removed from the machine by unclamping, and without disturbing the screws or other connections.

A scale is provided, which facilitates quick and accurate setting for desired width. The feed may be stopped or started from the feeding in end or working side. The feed rolls, six in number, are 9 inches in diameter and are driven by gearing, insuring positive results under all conditions; the two top carrying in rolls are divided into two sections, and have chip breakers to conform. A center guide is furnished, and removable spring lever guides for holding stock thereto. All cutter head and side spindle pulleys are of the pneumatic type, used only by this company. The machine is built to work 24 inches or 30 inches wide, 14 inches or 16 inches thick.

The American Sheet Steel Company have paid to the Board of Trade at Coshocton, Ohio, \$21,408, the cash value of lands donated to the Coshocton Rolling Mill Company, who were taken over by the American Sheet Steel Company. The plant has not been operated for some time, and as the agreement with the city was that the plant was to be operated continuously for 15 years, it has been decided to return the bonus.

The Brown & Sharpe High Speed Milling Attachment.

The high speed milling attachment made by the Brown & Sharpe Mfg. Company of Providence, R. I., is intended for their Nos. 1, 1½, 2, 3 and 4 universal and Nos. 1, 2, 3 and 4 plain milling machines. It is designed for light or finishing cuts with end mills. The attachment is simple in construction; there being no auxiliary fixtures or extra belting required for attaching the device to the machine, and as many changes of speed can be obtained as there are changes for the main spindle of the machine. The spindle is hardened and ground,

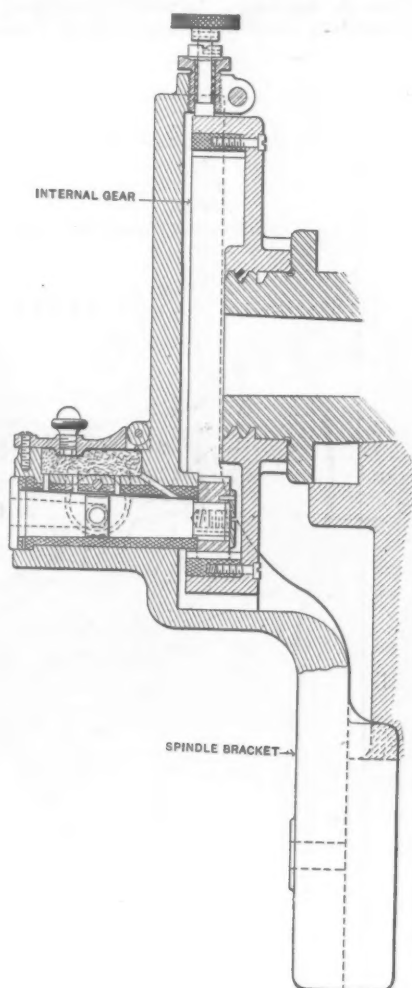


Fig. 2.—Vertical Section Parallel with Spindle.

runs in a bronze bearing provided with means of compensation for wear; and is driven by an internal gear that is screwed onto the cone spindle of the machine, and meshes with a pinion on the spindle of the attachment, as shown in the section, Fig. 2. The mechanism is inclosed and protected from dirt and injury. The speeds obtained with the different machines range from 354 to 1800, the Nos. 1 being 354 to 1591, the Nos. 1½ and 2 being 657 to 1721, the No. 3 universal being 643 to 1462, the No. 3 plain 571 to 1670 and the No. 4 being 504 to 1800.

The Chilcote-Evans Chain Company, Allegheny, Pa., manufacturers of chains for all purposes, have received an order from a New York steamship company for 150 to 200 feet of ship chain. The links in this chain will be 2½ inches in diameter; each link will weigh 52½ pounds to the foot, and will be 12 inches long. This is one of the largest orders for heavy chain placed for some time.

The Navy Department has decided to locate the new dry dock at the Brooklyn navy yard between the present docks, Nos. 1 and 2. The new dock will cost \$1,000,000.

The Dominion Iron & Steel Company, Limited.

Probably no undertaking in recent years has attracted more attention, internationally, in the iron trade than that of the Dominion Iron & Steel Company, Limited, of Sydney, C. B., because the favorable conditions underlying it came to the majority as a revelation. Briefly these are a low cost of assembling, at tidewater, of cheap raw materials, fair in quality, so that pig iron and steel may be made at astonishingly low figures, to which must be added the fact that during the early years of its career the enterprise will enjoy the very liberal bounties granted by the Dominion of Canada. Under the management of A. J. Moxham, formerly identified with the Johnson Company and the Lorain Steel Company, the

Sir Wm. C. Van Horne, Montreal.
Robert Mackay, Montreal.
R. B. Angus, Montreal.

Iron Ore.

The Dominion Iron & Steel Company, Limited, have acquired by purchase iron ore property on Great Bell Island, in Conception Bay, Newfoundland, about 35 miles from St. Johns. This island, which is about 8 miles long and 2 miles wide, has exposed on the cliffs of its northern side five beds of ore, of which three, however, extend over so small an area and are so thin that they are of little commercial value. The two others are known as the upper and lower beds and constitute the

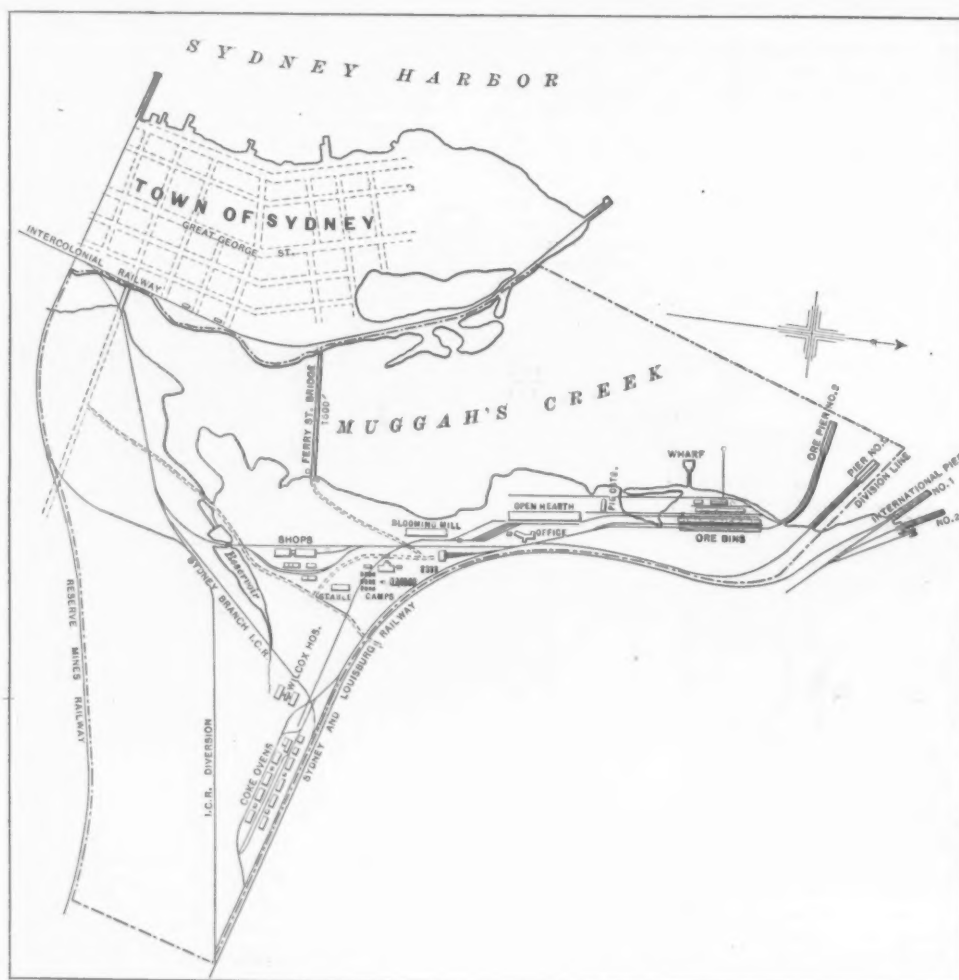


Fig. 1.—Location of the Works on Sydney Harbor.

THE DOMINION IRON & STEEL COMPANY.

very latest metallurgical improvements and appliances have been adopted, so that it may be regarded as a model plant.

The company are one of the creations of Henry M. Whitney, who has been deeply interested at Sydney, Cape Breton, for some years in the development of the Dominion Coal Company.

The Dominion Iron & Steel Company, Limited, of Sydney, C. B., have a capital stock of \$15,000,000 and are authorized to issue \$8,000,000 of first-mortgage bonds, of which \$6,000,000 5 per cent. bonds, payable July 1, 1929, have been issued. The Board of Directors consists of:

H. M. Whitney, Boston, president.
A. J. Moxham, Sydney, C. B., vice-president and general manager.
H. F. Dimock, New York.
Hon. George A. Cox, Toronto.
B. F. Pearson, Halifax.
Hon. David McKeon, Halifax.
J. S. McLennan, Boston.
Elias Rogers, Toronto.
James Ross, Montreal.
W. B. Ross, Halifax.
Almeric H. Paget, New York.

Wabana mine. The lower bed was purchased by the Dominion Iron & Steel Company from the Nova Scotia Steel Company, who still control the upper bed. This deposit was described in detail by R. E. Chambers some years since in the columns of *The Iron Age*. Since then a shipping pier has been built on the southern side, where there is a very good harbor. Near the island there are 48 to 84 feet of water, the bay being navigable from eight to ten months in the year. The dock has ten pockets of 200 tons capacity, each at a height sufficient to discharge into a steamer by gravity. Boats of 5000 tons capacity can be loaded in about five hours. The harbor is located about 425 miles from the works at Sydney. The ore has been mined since December, 1895, considerable quantities having been shipped to the United States and to Europe. During the year 1899 the shipments were about 300,000 tons, and the mines are now equipped with conveyors, steam shovel, bins, &c., of sufficient capacity for the mining of 6000 tons of ore per day when required. It is estimated that the cost of mining and loading on vessels for some years to come will not be over 50 cents per long ton, and that at no time should the cost

exceed from 80 cents to \$1. It can be freighted to Sydney at a cost of from 35 cents in ordinary times to 45 cents on the higher basis of recent times. The ore, therefore, will not cost more than 85 cents as a minimum to \$1.45 per ton as a maximum, delivered in Sydney. Mr. Moxham regards \$1.10 per ton as a safe average, all told. Two recent analyses of the ore show the following, being maximum and minimum of recent cargo shipments:

Analyses of Bell Island Ore.

	Per cent.	Per cent.
Moisture	1.50	2.50
Iron	54.43	51.84
Silica	9.34	13.00
Phosphorus	0.744	0.835
Sulphur	0.05	0.030

It is estimated that the mine contains about 25,000,000 tons above sea level, with a much larger quantity in the lower levels. Besides the Wabana deposit the Dominion

Fixed carbon.....	60.45	62.91	61.49
Sulphur	1.64	1.50	1.56
Ash.....	5.65	4.09	5.41
<i>Washed coal.</i>			
Moisture	1.01	1.08	0.84
Volatile matter.....	32.99	33.92	37.86
Fixed carbon.....	62.21	61.69	62.60
Sulphur	1.11	1.07	1.17
Ash	3.79	3.31	4.50
<i>Retort coke.</i>			
Sulphur	0.91	0.78	1.01
Ash	6.07	5.38	6.24

As for the quality of the coke, that has been determined and thoroughly tested by its use in the blast furnace. The same coal has been coked on an extensive scale in the Otto-Hoffman by-product coke oven plant at Everett, Mass., a duplicate of which is now being erected at Sydney. It is estimated that the coal can be mined, washed and delivered at the furnace at a price not to exceed \$1.25 per ton.

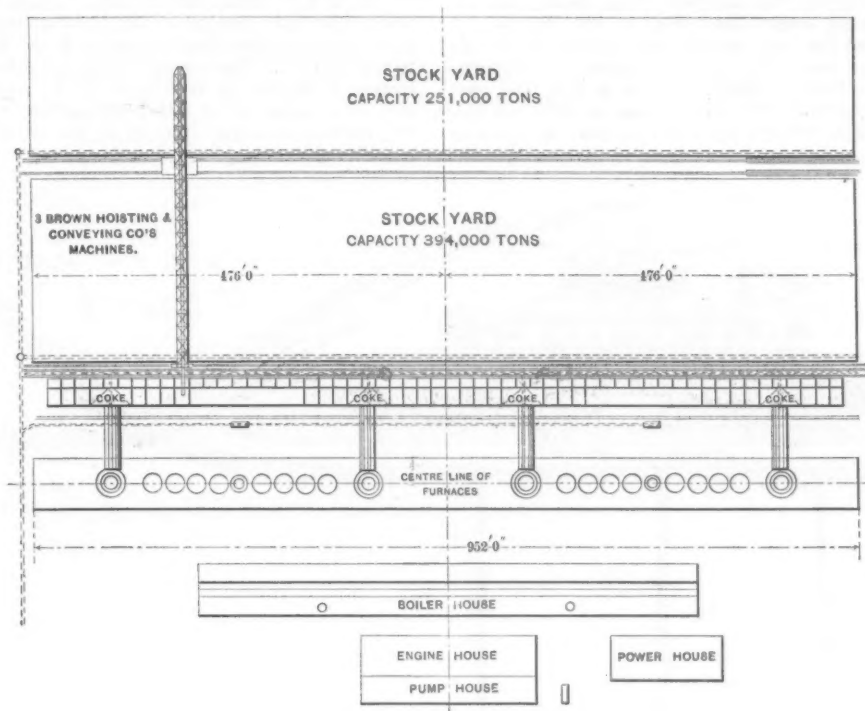


Fig. 2.—Plan of Stock Yard.

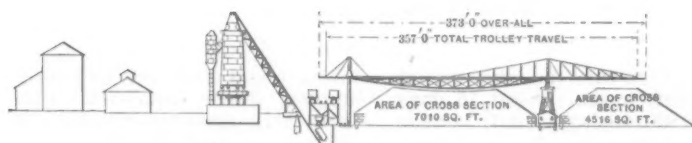


Fig. 3.—Elevation of Stock Yard.

THE DOMINION IRON & STEEL COMPANY.

Iron & Steel Company own an iron mine in the Santiago district of Cuba.

Coal and Coke.

The Dominion Iron & Steel Company have the option of leasing the Dominion Coal Company, including all their mines, and the Sydney & Louisbourg Railway, on condition of paying the fixed charges and 6 per cent. annually on the common stock. The reserves of fuel in the Sydney field are enormous, it being estimated that the Dominion Coal Company control areas which can be counted on to deliver over 2,500,000,000 tons of coal. This fuel is bituminous, the following analyses showing the constitution of the raw coal, of the washed coal and of retort coke for different mines:

General Coal Analysis.

	Reserve mine.	Caledonia mine.	Dominion mine.
	Per cent.	Per cent.	Per cent.
Raw coal.	1.45	1.54	1.21
Moisture	32.45	30.86	31.89
Volatile matter.....			

Limestone.

The Marble Mountain limestone quarries are located at Clark's Cove, on West Bay of the Great Bras d'Or Lakes. The quarry is at an elevation of about 300 feet above the level of the lake, and the deposit, which is a true marble, is of an especially good quality. From the quarry the stone is lowered to a crusher by a double skip car system with drum at top, the loaded car hoisting the empty. The crushed stone is fed by gravity to a 24-inch conveying belt, which carries it to an open bin at the foot of the mountain. Underneath the bin's chutes there is arranged a 36-inch conveying belt, of a capacity of about 600 tons per hour, which carries the crushed stone to an incline belt leading directly to the loading pier. This also has a capacity of 600 tons per hour, and the barges or vessels for transportation can be loaded in three to five hours. In addition to the excellent marble quarry the company have developed a dolomite quarry at George's River, about 14 miles from the works at Sydney. This quarry has a capacity of about 1200 tons per day.

Government Bounty.

The bounties on the manufacture of iron and steel granted by the Dominion of Canada are as follows:

	On pig iron		
	from native ore.	from foreign ore.	On steel.
To April 21, 1902.....	\$3.00	\$2.00	\$3.00
April 21, 1902, to July 1, 1903..	2.70	1.80	2.70
July 1, 1903, to July 1, 1904....	2.25	1.50	2.25
July 1, 1904, to July 1, 1905....	1.65	1.10	1.65
July 1, 1905, to July 1, 1906....	1.05	.70	1.05
July 1, 1906, to July 1, 1907....	.60	.40	.60

When it is considered that the present plant, as laid out, has an annual capacity of 250,000 tons of steel and of 150,000 tons of pig iron for the open market, the magnitude of these figures will be apparent. The company are also free from local taxes of the county of Cape Breton for 30 years.

Sydney Harbor.

The mines are located in the harbor of Sydney, the town having donated to the company about 500 acres of land within the town, the position being clearly shown in the accompanying engraving, Fig. 1. So far as the harbor is concerned the impression that Sydney is in the polar regions is far from the truth. Taking the Government reports from 1880 to 1899, they show that the earliest closing of Sydney harbor by ice was in 1880, on December 31, opening in 1881 on April 29; so that then it was

houses are neat in design and equipped with all modern improvements.

Fresh Water Supply.

The fresh water supply for the works is obtained from Sydney River, which is about 5 miles from the location of the works. A dam and pumping station have been constructed on this river for separating the fresh from the salt water, and the drainage from an area of 65 square miles is available for service. The dam is about 240 feet long and has a depth of 20 feet at the center of the stream. It is constructed of cribbing filled with stone; the salt water side is planked with creosoted timber, the fresh water side is sealed by means of a puddle face and gravel slope. The dam is provided with fish-way and the company have constructed a lock which will allow a boat 20 feet wide, 6 feet draft at low water, and 50 feet long, to pass through during the open season of navigation.

The pumping station is constructed of brick and is equipped with two horizontal tubular boilers of capacity of about 110 horse-power each. These are strongly built and especially designed for a working pressure of 150 pounds per square inch, built by T. A. McLean, Charlotte-town, P. E. I. The pumps were manufactured by Worthington Company of Brooklyn, N. Y., and are two in number, of a capacity of 3,000,000 gallons each per 24 hours, the estimated requirements of the works for fresh water.

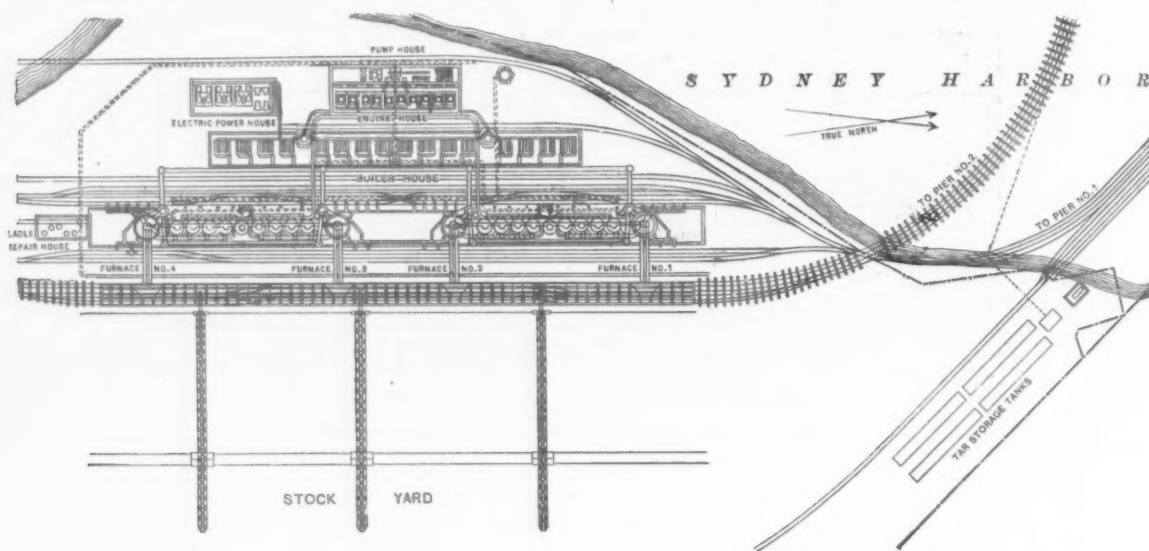


Fig. 4.—Plan of the Blast Furnace Plant.

THE DOMINION IRON & STEEL COMPANY.

closed four months. As a context to this the other periods of closing are as follows: 1892, harbor closed 16 days; 1894, 25 days; 1895, 6 days; 1896, 10 days; 1897, 14 days; 1898, 30 days. An average for the whole 19 years shows that the harbor was closed February 3 and opened March 14. The average closing of the harbor, therefore, is covered by 39 days. In 1900 the harbor was open the whole winter. In this respect, therefore, Sydney is better off than the lakes, upon which the American steel industry depends.

The winter shipping point of the Dominion Iron & Steel Company will be the port of Louisburg, which is open all the year round. It is about 22 miles distant as a crow flies from the works and is connected with them by the Sydney & Louisburg Railway, something over 40 miles long.

The Plant.

The works proper, to which these outside developments are tributary, consist in general of a plant of four blast furnaces, ten 50-ton open hearth furnaces, a 35-inch blooming mill and pit furnaces, 400 Otto-Hoffman coke ovens, coal washing and sulphuric plants and essential by-product plant, and a large machine shop and foundry capable of taking care of all mill and furnace work.

In connection with these works there is about 20 miles of railroad track, full ore handling equipment, receiving and shipping piers, and all the necessary attributes to a well equipped modern plant.

The actual work of construction has been under way about 14 months and the coke ovens and blast furnaces are expected to go into operation shortly.

The company own a tract of real estate, on which they have erected a number of houses of a better class; these

being about 3,000,000 gallons per day. The pumps are duplex, direct connected triple expansion condensing, with high pressure cylinder 12 inches in diameter, the intermediate cylinder 19 inches in diameter, the low pressure cylinder 30 inches in diameter, the plunger 16 inches in diameter—all with 24 inches stroke.

The pump house is provided with a large well, to which the water is admitted through intake pipe, constructed of cypress wood, leading from a crib provided with screens, and located at the center of the river. This supply is abundant and the water of an excellent quality; about 600 feet of the main line is of 36-inch pipe and the balance to the works along the roadway and through the company's property is 24 inches in diameter. All the iron is the bell and spigot pipe of the ordinary water works specifications. Connections have been provided for the town of Sydney and other consumers, in case of additional water supply being required. On the water main inside the works is located a stand pipe 20 feet in diameter, 85 feet high. Salt water will be used for blast furnace circulating system.

The Ore Handling Plant.

The ore handling plant consists of a pier upon which will be located four hoisting machines or towers of a type similar to those used on the Montreal docks for handling coal. These towers have given very satisfactory results, and are a quick machine for the handling of all heavy materials. The capacity of each tower is 1200 to 1500 tons per 24 hours. These are designed and built by the Dominion Bridge Company of Montreal. The machines are mounted on trestle work above a superstructure, upon which is provided a double track system for handling of cars. Ore is unloaded directly from the

boats to shallow bins, or hoppers, which form part of the mechanism, and the ore is delivered through these to hopper bottom cars.

The above mentioned track trestle work leads from the pier about 1100 feet to the ore bins, which are provided with three tracks with suitable cross overs for the handling of coke, ore and limestone for the regular furnace supply, and for the storage in the stock yard. (See Figs. 2 and 3.) The stock yard is provided with three Brown Hoisting & Conveying Machine Company's traveling machines, similar to those used at the Duquesne furnaces of the Carnegie Company, and of a cross section shown in Fig. 3. These three machines have ample capacity for taking care of the storage of six months' supply of material, as well as for rehandling of stock for the winter operation of the blast furnaces.

The stock yard, which is commanded by three Brown machines, has an effective width of 366 feet, and is 952

skip pit, in which the coke is fed directly into the skip car, which takes it to the furnace. There are 28 bins for use for ore or limestone, being seven for each furnace.

The Brown machines are independent motor driven, the span of the bridge being 225 feet and of the cantilever 105 feet. The back leg of the machine is mounted on rails 16 feet from center to center. The motors are located on the truck of the back leg of the machine, and are enclosed in a suitable engine house. The operators' house is located directly above, and on the side of the leg of the machine.

The Furnace Plant.

There are four furnaces built and erected under contract with the Riter-Conley Mfg. Company of Pittsburgh. The furnace stacks are 20 feet in diameter at the bosh and 85 feet high. The diameter of the hearth is 11 feet 9 inches, at stock line it is 14 feet 6 inches, and there

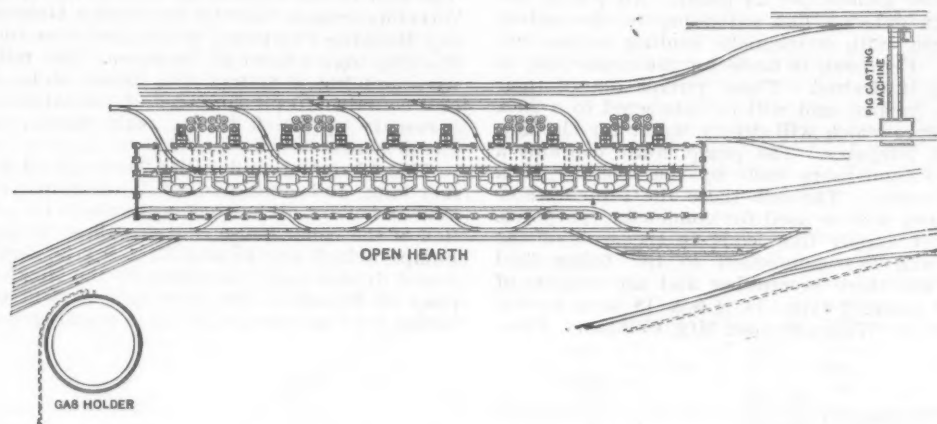


Fig. 5. The Open Hearth Steel Plant.

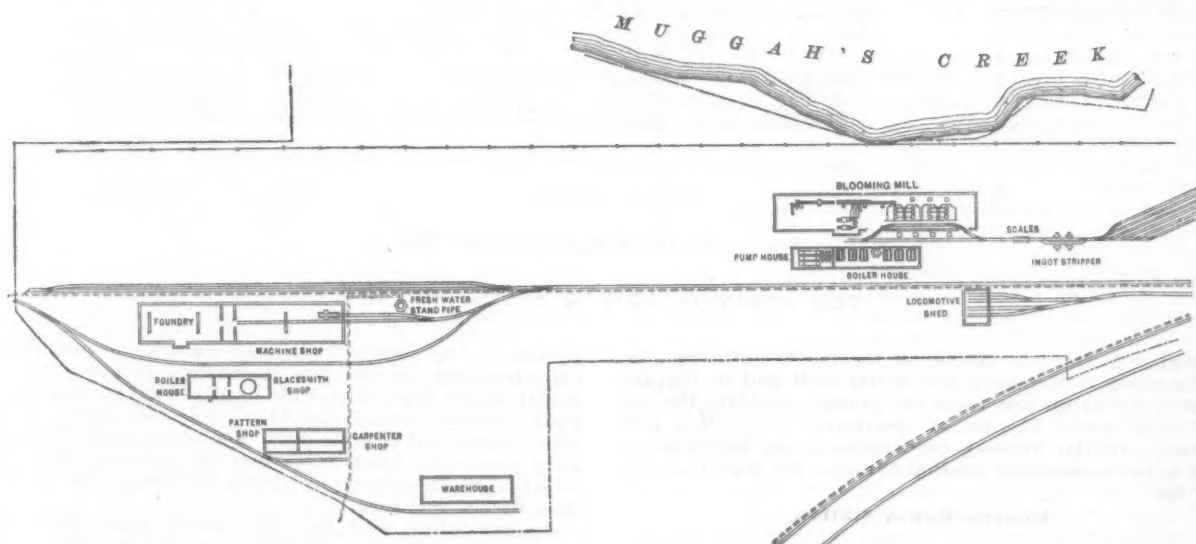


Fig. 6.—Plan of Blooming Mill.

THE DOMINION IRON & STEEL COMPANY.

feet long, with tracks for an extension of 150 feet, making the available length of the cross section, shown in Fig. 3, about 1100 feet. This yard is of a capacity sufficient to take care of six months' supply of ore and limestone for four blast furnaces. The ore is brought in from the pier upon which the unloading machines are located in the before described manner and transported to the top of the bins, from whence it is dropped into the stock or storage bin, the former delivering its supply to a motor driven scale car underneath, which transfers the stock to the skip cars, or the latter, which delivers the stock to transfer cars, upon which are placed two 3-ton buckets, which are handled by the Brown machine, the stock being lifted and deposited in the yard for winter use. In the winter season the Brown machines with scoop buckets gather material from the stock pile and deposit it into the stock bins or into drop bottom cars, from which the material is transferred to the supply bins, from whence it is taken to the furnaces by the scale cars. The bins for storage are all of the same cross section and are 56 in number; there are four large coke bins over the center of each

are 12 6-inch tuyeres. Each furnace is provided with Julian Kennedy's patent top filling apparatus. The furnace shell is 28 feet in diameter at the mantle and 23 feet at the top of the furnace. The bustle pipe surrounding the columns is 46 feet in diameter. The tuyere stacks, 12 in number, are of an improved type, with ball joints and adjustable blow pipes.

The skip hoist leading from under the stock bins to the top of the furnace is of structural steel and carries two skip cars, which rest at the bottom in a steel cased pit.

The stoves are of the Cowper type, with a casing 21 feet in diameter by 85 feet high. The stove chimneys are 9 feet in diameter inside the lining, are 200 feet high, and are provided with heavy cast iron bases and are bolted to the foundation.

The boiler house, as shown on plan, Fig. 4, is 53 feet wide and 576 feet long. It is a steel building with brick walls and heavy concrete foundations. It contains 8000 horse-power of boilers, with two steel stacks, one for each 4000 horse-power of boilers. These stacks are of

steel, 11 feet diameter inside the lining, and 200 feet high. The boilers are connected to these stacks by overhead breeching. They are of the Babcock & Wilcox type, amply strong for working pressure of 150 pounds to the square inch.

The engine house is 44 feet 2 inches span and 200 feet long. It contains five pairs of blowing engines built by the E. P. Allis Company and commanded by one 30-ton electric overhead traveling crane. These engines each have a high pressure cylinder 50 inches in diameter, a low pressure cylinder 96 inches in diameter, with a blowing tub 96 inches in diameter, all of 60-inch stroke.

The pump house, which is a lean-to on the engine house, is of 30 feet span, 200 feet long, and contains three horizontal Wilson-Snyder compound direct connected circulating pumps, having steam cylinders 18 and 32 inches in diameter. The bronze plungers are 24 inches in diameter by 36 inches stroke. The pumps are each rated at 6,000,000 gallons per 24 hours. All pumps are connected to an exhaust line extending to the end of the engine house, with connections leading to the condenser system. Provision is made for the connection of a fourth pump if desired. These pumps obtain their water from the harbor, and will be connected to a 20 x 85 foot stand pipe, which will supply water for circulating and cooling purposes. The pump house contains a pair of surface condensers built by the Borthey Mfg. Company of Toronto. Through these the return water from the furnaces will be used for condensing purposes. The fresh water supply line leads to the wall of the engine house and has connection to the boiler feed pumps, which are three in number and are duplex, of outside packed plunger type, 14 x 9 x 18 inch stroke. These were built by Wilson-Snyder Mfg. Company, Pitts-

The product of the furnaces, which is estimated at 1400 tons per day, will be tapped into 50-ton ladles, from which it is poured into the molds on cars and transferred to the stripper building to be deposited in the pit furnaces. The open hearth building has a span of 65 feet with a lean-to 37 feet wide, and is 832 feet long.

The gas for the open hearth furnaces will be obtained partly from producers of the latest improved type and partially from the coke ovens. A 1,000,000 cubic foot triple lift gas holder is located as shown on the plans adjacent to the furnaces, and is so constructed as to give a working pressure of 5-inch column of water.

The Blooming Mill.

The blooming mill, shown in Fig. 6, has a 35-inch train, which was built by the Mackintosh-Hemphill Company of Pittsburgh. It is direct driven by a pair of 50 x 60 inch reversing engines of their latest design. The mill is commanded by two 20-ton electric overhead traveling cranes, built by the Brown Hoisting & Conveying Machine Company, to be used also for charging or drawing ingots from pit furnaces. The mill and pit furnace building is 81 feet 10 1/4 inches wide, 480 feet long, and contains 16 pit furnaces of the latest type, also the necessary approach tables, main tables, hydraulic and steam shears.

The blooming mill boiler house is 46 feet span, 296 feet long, and contains 3000 horse-power of Babcock & Wilcox boilers, all located as shown on the plan. One section of the boiler house contains three hydraulic pressure pumps, which are 18 and 32 x 8 x 36 feet, of the compound duplex type, furnished by the Northey Mfg. Company of Toronto. The hydraulic system will be of the return type and designed for a working pressure of 500

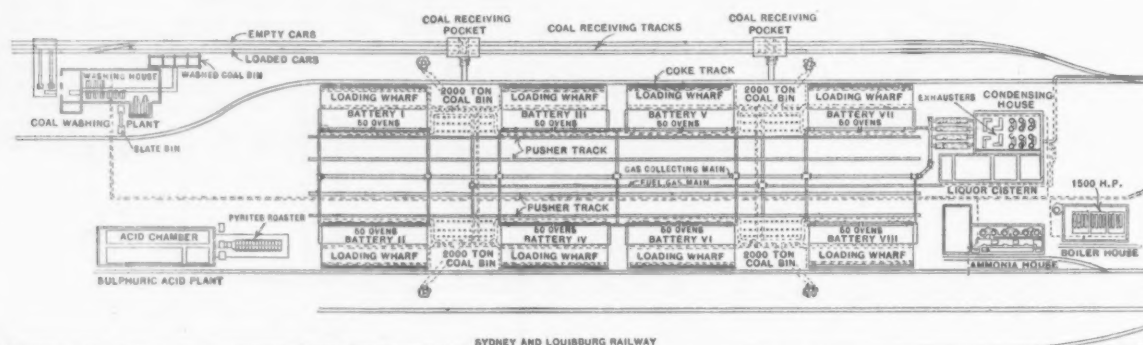


Fig 7.—The Otto-Hoffman Coke Oven Plant

THE DOMINION IRON & STEEL COMPANY.

burgh. A valve is placed on the fresh water line for connection to the main salt water well and to the salt water discharge line from the pumps, enabling the use of fresh water in case of emergency for cooling purposes. To the Northey condensers in the pump house there is a connection leading through the wall to a line to the

Electric Power Station.

This part of the equipment consists of three 500-kw. electric generators built by the Canadian General Electric Company, and each driven by a cross compound condensing engine with cylinders 20 x 40 inches in diameter, 42 inches stroke, running at a speed of 90 revolutions. They were built by Laurie & Co. of Montreal. The building, which has 51 feet 3 inches span by 130 feet long, is of steel with brick wall filling. The structural work was furnished by the Dominion Bridge Company of Montreal. The electric machinery is commanded by a 15-ton crane, also designed and built by the Dominion Bridge Company. The switchboards, booster and electric appliances are all of the latest type, and the entire equipment of the electric power station was furnished by Canadian manufacturers.

The metal from the furnaces will be taken in 25-ton ladle cars to a motor driven pig casting machine, which was built by the Heyl-Patterson Company, Pittsburgh, and which has a capacity of 1600 tons per 24 hours, or hot metal may be taken direct to the open hearth furnaces.

The Steel Plant.

The plant consists of ten 50-ton open hearth steel furnaces. They are of the tilting type, and the Bertrand Thiel process may be used. These are arranged in a continuous row, and metal may be put into the furnace from either side, or cold pig or stock may be placed in the furnaces by two Wellman-Seaver charging machines. The general lay out is shown in Fig. 5.

pounds to the square inch, with suitable accumulators and operating valves. The boiler feed pumps are compound duplex type, also made by the Northey Mfg. Company, Toronto, being 8 and 14 x 7 x 18 feet stroke. Suitable heaters will be provided. The boiler house building is of steel with brick walls and the same general construction as the other steel work buildings—size 46 feet span by 296 feet long.

In connection with the open hearth plant there will be erected a calcining, grinding and mixing plant of capacity sufficient to furnish all refractory material, linings, &c. This plant will be equipped with the usual mixers, crushers, elevators, bins and calcining cupolas. The building will be made of steel with brick wall filling.

The stripper building will be made of structural steel covered with corrugated iron. It will be of the usual tower type, 35 x 35 feet in size, and will contain the double cylinder Aiken stripper and double set of car pushers, duplicates of the pushers which will be used in the open hearth.

The ladle repair shop will be located at the end of the furnace plant, and will be 35 x 80 feet, a steel building bricked in, and will be provided with crane runways and hand or electric crane of 15 tons capacity. There will be sufficient room for the handling and repairing of six ladles.

It is contemplated to discharge a large quantity of tar on one side of the No. 2 pier. The tar will be brought in tank cars from the coke oven plant to storage tanks shown on the plans, Fig. 4, and pumped into tank steamers.

The Coke Oven Plant.

The coke oven plant, which is being erected under contract with the United Coke & Gas Company, is in general a duplicate of the works which were erected for H. M. Whitney, president of the company, at Everett, Mass. The plant, as shown in plan in Fig. 7, consists of two rows of four batteries, each consisting of 50 ovens

each, or a total of 400 ovens. These are of the Otto-Hoffman by-product type, and the capacity is rated at 1600 tons of coke per day. The plant consists of the necessary mechanism for the charging of coal and the pushing of coke from the ovens to a quenching floor or loading platform. These ovens are of the latest type and embody a number of changes in detail, from which the Dominion Iron & Steel Company receive the benefit of experience of former plants of this type. In addition to eight batteries they are provided with a condenser house 60 x 100 feet, with a cistern adjoining of 40 x 150 feet, and the necessary coolers, sieve washers, &c., for cooling and cleansing the gas. There is also a boiler house containing 1500 horse-power of Babcock & Wilcox water tube boilers, inclosed in a brick building 50 x 100 feet. Adjacent to this is the ammonia house, 40 feet span by 106 feet long, with adequate storing space.

Adjacent to the coke oven plant, as shown on plan, is the coal washing apparatus, which is inclosed in a building 50 x 150 feet, and is provided with the necessary raw coal bins, crushers, and washed coal bins for delivery to the ovens. The machinery and plant are practically of the design made by Stein & Boericke of Primos, Delaware County, Pa., who have successfully washed by the jig system coal of the class which is furnished by the Dominion Coal Company. The capacity of the plant will be 2400 tons per day.

The sulphuric acid plant was designed under the supervision of Chas. A. Bartsch, consulting chemist, of Philadelphia, and has a capacity of 40 tons of acid per day. It is equipped with the latest improved apparatus and is a modification of the old chamber system.

Pyrites will be used in the manufacture of this sulphuric acid, an adequate supply of which will come from the pyrites mines at Newfoundland. The plant is arranged for economical handling, and the sulphuric acid will be transferred from the storage chambers to the ammonia house in a tank car.

The machine shop, foundry, blacksmith shop, pattern and carpenter shops are located as shown on plan, Fig. 6. The machine shop is 52 feet span with a 20-foot lean-to on each side and 256 feet long, with a fire wall at the end. There is a cleaning room, of same cross section as the main building, between the machine shop and foundry. The shops are equipped with large and small lathes, planers and improved working tools for the handling of all mill and furnace work. At one end of the machine shop is located a locomotive pit, shown on the plan. The machine shop erecting floor is commanded by a 25-ton electric overhead traveling crane built by the Niles Tool Works. The foundry is the same cross section, 192 feet long, and contains two cupolas of capacity about 20 tons per hour. A three-pit brass foundry and the necessary blowers, hoists and equipment for mill and foundry are provided for serving the floor. There are two electric overhead traveling cranes; one, 25-ton, was built by the Niles Tool Works, and one of the same capacity with auxiliary hoist was built by the Dominion Bridge Company, Montreal. The boiler room contains an air compressor for furnishing power to the chipping and hoisting tools, and two boilers, 125 horse-power each. These are the Babcock & Wilcox water tube type. The electric station furnished power for lighting purposes during erection work and for the electric cranes through the works during construction. The blacksmith shop is equipped with bolt header, steam hammer and ordinary tools. The building covering this part of the outfit is of 52 feet 4 inches span and 192 feet long. The pattern shop and carpenter shop are fitted with full set of working tools, and in one corner of the pattern shop is located the tin shop equipment. This building is 52 feet 4 inches span by 192 feet long. A warehouse is located adjacent to the shop location and is 60 feet 8 inches span by 217 feet long.

Cost of Production.

A good deal of figuring has been indulged in in the Canadian press as to the cost of production at Sydney. Mr. Moxham has put himself on record as saying: "The cost of pig iron after crediting to the same the value of the by-products from the coke ovens should not exceed \$5.50 after everything has been reduced to steady practice. The cost of the steel bloom should not exceed \$11.25." These certainly are figures which even the most favored inland localities in the world cannot improve upon, if, indeed, they touch them. There is certainly none located on tidewater which can claim such cost. Naturally the principal outlet for the iron and steel produced will be in other countries than Canada. Sydney is only 2282 miles from Liverpool and 2564 miles from Antwerp. It is 600 miles from Boston. It is 719 miles from Montreal by water as compared with 710 miles from Pittsburgh to that point. It is expected that some of the tonnage will be placed in the Dominion, but the bulk will undoubtedly go to Europe, particularly in the earlier stages of the enterprise, when pig iron and steel

blooms will be the only products. We understand that the company have chartered for a long period seven steamships controlled by an English and American company. That ultimately the Dominion Iron & Steel Company will aim to market their metal in the finished rather than in the cruder forms is quite evident. There has been some gossip bearing on this point, but we understand that as yet no serious negotiations have been undertaken.

In a few days the first blast furnace of the company will blow in, to be followed soon by the second stack. The other two furnaces and the steel plant are to go into operation next spring and summer.

The Austrian Iron Combination.

The Vienna correspondent of the London *Economist* reports as follows relative to the collapse of the Austro-Hungarian pool:

The Rimamuranyi Iron Works Company, as the leading firm of the Hungarian participants in the great Austro-Hungarian trust of iron and steel manufacturers, yesterday received an intimation from the Austrian partners to the effect that they had decided to break up the trust, so that it ceases to exist from the day on which the intimation was sent. The action of the Austrian partners in the trust is justified by the fact that the Rimamuranyi Company purchased the works of the Hernadthal "and Union" Companies on their own account, although the conditions of the trust were that all arrangements with works outside the trust were to be made by common accord, so that a breach of the trust has taken place. The Austro-Hungarian Iron and Steel Trust was founded in May, 1886, and was to last only 20 months. Its chief aim was to let all works forming part of it have a fair share in the total production, which was at that time between 5,000,000 and 6,000,000 metrical hundredweight a year for Austria, and 1,500,000 hundredweight for Hungary. It had been agreed that the Austrian works might deliver 135,000 metrical hundredweight to Hungary every year, the Hungarian works a like quantity to Austria, in each instance at the prices fixed by the trust. In 1888 the arrangement was renewed for three years, then for five more years, and the last arrangement prolonged the trust until January 1, 1902. Negotiations for the renewal took place during the last half year of each of the arrangements, and they generally caused conflicts, as both Austrians and Hungarians were anxious to change the existing conditions in their favor. It was agreed that a breach of the conditions should at once break up the trust. But the Hungarian partners in the trust do not admit that there has been a breach, and declare that the Austrian partners broke up the trust because the Rimamuranyi, after purchasing the other works, thought itself justified in demanding a larger share of the iron and steel to be sold to Austria, which the Austrians are not disposed to grant. As matters stand at present the Hungarian works might demand that a court of arbitration should be appointed, but as this would protract affairs, the Hungarians will refrain from doing so. The probable consequence of the breaking up of the trust is that Hungarian works will reduce their prices as much as they can, and that keen competition will follow. Some big firms of dealers have already countermanded orders, as they feel convinced that they will now obtain goods at much lower prices. For Hungary the breaking up of the trust is not a loss, as its production has considerably increased since 1886, and it could not much longer have consented to the conditions of 15 years ago.

The Eastern Shipbuilding Company have begun operations and are preparing to build for the Great Northern Steamship Company two steel steamships, which will be about 628 feet long, have 73 feet beam, and cost about \$5,000,000. The plant is located at Groton, Conn., upon the Thames River, opposite the city of New London, upon land leased in April last from the New York, New Haven & Hartford Railroad Company. Charles R. Hanscom, formerly general superintendent of the Bath, Maine, Iron Works, is president and general manager; John Sherman Hoyt of 47 Cedar street, New York, is treasurer. The company were incorporated last March under the laws of New Jersey, with \$500,000 authorized capital stock, all of one class and all subscribed, but only part issued. There are no bonds outstanding.

The Link-Belt Engineering Company of Nicetown, Philadelphia, have opened an office in Pittsburgh, Pa., for the transaction of business in that vicinity. T. Frank Webster, link belt engineer, is in charge, with offices at 1501-1502 Park Building.

British Production of Pig Iron and Steel.

The British Iron Trade Association has published statistics of the make of pig iron in the United Kingdom for the first half of 1900, which show a total of 3,973,403 tons for England and Wales, and of 567,000 for Scotland, making a grand total for the six months of 4,540,403 tons, or at the rate of 9,080,806 tons a year. The following are the figures for the different districts:

District.	Make of Pig Iron in Different Districts.	
	First half 1899.	First half 1900.
	Tons.	Tons.
Scotland	620,000	567,000
Durham	1,645,360	490,088
Cleveland	448,516	1,054,682
West Cumberland	371,457	451,759
Lancashire	467,960	365,031
South Wales	215,140	448,593
South Staffordshire	210,247	201,020
Derbyshire	119,482	177,706
Northamptonshire	177,961	126,874
Lincolnshire	145,609	156,987
Notts and Leicestershire	143,167	132,393
North Staffordshire	151,238	168,652
West Yorkshire	26,015	140,613
Shropshire	40,716	19,846
North Wales, &c.		39,159

Totals 4,782,868 4,540,403

The production of forge and foundry iron was 2,139,468 tons, that of hematite or Bessemer 1,949,324 tons, and that of basic pig, spiegel and ferro 451,611 tons.

The returns made to the British Iron Trade Association by manufacturers show that the total output of open hearth steel ingots for the first half of the year 1900 amounted to 1,624,823 tons, against 1,581,319 tons for the first half of 1899. The largest output during the first half of 1900 has taken place in Scotland, where the total make was 502,911 tons, but the output on the Northeast Coast was 498,341 tons, which is only about 4900 tons less than the output of Scotland. The comparative returns for the two half years are as under:

Make of Open Hearth Steel in the United Kingdom in First Half of 1899 and 1900.

District.	First half of 1899. First half of 1900.	
	Tons.	Tons.
Northeast Coast	545,115	498,341
Scotland	517,107	502,911
Wales, North and South	195,279	331,272
Sheffield and Leeds	127,912	123,717
Lancashire and Cumberland	83,381	84,763
Staffordshire, Lincolnshire, &c.	112,525	83,819

Totals 1,581,319 1,624,823

Of the total product of the first half of 1899 1,443,398 tons was acid steel, while that of basic was 137,921 tons. During the first half of 1900 the production of acid open hearth steel had increased to 1,513,957 tons, while the basic make had declined to 110,866 tons.

The returns collected by the association show that for the first half of 1900 the total make of open hearth steel in the United Kingdom amounted to 698,046 tons of plates and angles, 213,570 tons of blooms and billets, and 284,869 tons of bars, &c. These are the chief finished products of the open hearth steel works of Great Britain, and the totals of all three descriptions make up 1,196,485 tons of finished steel out of a total of 1,624,823 tons of ingots. The balance is made up of castings, forgings, tires, axles and other descriptions.

The statistics furnished by manufacturers to the British Iron Trade Association show that the total output of Bessemer steel ingots for the first half of 1900 amounted to 1,038,279 tons, compared with 1,005,922 tons for the first half of 1899. The largest output was 267,180 tons, produced in South Wales, and the next largest make was 216,034 tons, produced in West Cumberland. The details are annexed:

Make of Bessemer Steel Ingots in the United Kingdom.

	First half of 1899. First half of 1900.	
	Tons.	Tons.
South Wales	274,572	267,180
Cleveland	174,534	181,925
Sheffield and Leeds	191,196	205,232
West Cumberland	174,355	216,034
Lancashire and Cheshire	113,842	89,740
Staffordshire, Shropshire and Scotland	77,423	78,168

Totals 1,005,922 1,038,279

The total make of acid Bessemer steel ingots for the first half of 1900 was 859,686 tons, and of basic ingots the make was 278,593 tons, against 748,919 tons of acid and 257,003 tons of basic steel for the first half of 1899.

The next table gives details of the output of Bessemer steel rails for the first half of 1900, compared with the first half of 1899:

Make of Bessemer Steel Rails in the United Kingdom.

	First half of 1899. First half of 1900.	
	Tons.	Tons.
South Wales	89,486	79,413
Cleveland	74,616	71,008
Sheffield and Leeds	71,200	74,504
West Cumberland	110,000	113,406
Lancashire and Cheshire	71,771	42,818

Totals 417,073 381,149

The total make of rails for the first half of 1900 is only 36 per cent. of the total make of ingots, and compares with 417,073 tons for the first half of 1899.

The total British production of steel, apart from crucible, in the first half of the current year, has been as under:

	Tons.
Open hearth	1,624,823
Bessemer	1,038,279
Total	2,663,102

This is at the rate of 5,326,264 tons a year, and is a larger output than has ever before been reached in any former period of six months.

British Rail Makers and American Competition.

A meeting of the steel rail manufacturers about which a great deal of secrecy has been observed was held in London on Thursday and was largely attended by representatives of the various works concerned. For a long time the price of heavy rails has stood at from £7 to £7 5s. per ton, the figure agreed upon by the makers, but it has become apparent of late that in face of the growing and serious competition which is being met with daily from the United States some alteration would have to be made or the rail orders would entirely go past this country. Hence the meeting on Thursday to review the situation and to arrange a concerted plan of action. We understand that it has been decided to allow what is practically a free hand to each maker, and that in consequence of this orders will be considered strictly upon their merits. The fixed price, in fact, has been abolished, and the market, so long a closed one, has been thrown open to competition. We understand that an immediate drop in the price of heavy sections to £6 10s. came into effect at certain works as soon as the meeting was over, and it appears likely that this price would be accepted for any orders of an ordinary nature. It, in fact, was quoted on Thursday for an average lot of heavy rails. On the other hand, the deliberations had a further result in that an arrangement was arrived at by the meeting that in the event of large orders being put forward the matter of a quotation should be settled at a meeting of the associated members, at which a special price will be fixed. People in an excellent position to know how matters stand assert that for specially large lots there is no doubt but that makers would take £6. The action of the association has aroused a great deal of curiosity, and the decisions arrived at are heralded, so far as can be gleaned up to the time of going to press, with every appearance of satisfaction.—*The Ironmonger.*

The Sharon & Butler Railroad Company, who were granted a charter recently to build a road from Sharon to Butler County, are another of the many enterprises of the Sharon Steel Company, who are expending large sums of money in Sharon in new mills. The incorporators are George W. Darr of Pittsburgh, who has been elected president of the road; J. H. Moore and Senator William Flinn of Pittsburgh; F. H. Buhl, John Stevenson, Jr., and James P. Whitla of Sharon, directors. The proposed line will be 30 miles long and will run from the steel plant of the Sharon Steel Company through Mercer and Lawrence counties to Butler County. The railroad will be used exclusively for hauling coal and limestone from the Sharon Coal & Limestone Company's property to the Sharon Steel Company Works, South Sharon, Pa. The cost will be between \$500,000 and \$600,000, including locomotives and rolling stock. The Sharon Steel Company have leased over 3000 acres of coal and limestone property near Volant and Leesburg, and have located a 4-foot vein of fine coal. It is said that enough coal could be mined in this district to supply every industrial concern in the Shenango Valley for the next century, and then not exhaust the supply. Work on the new road will be started soon, and a force of 400 men will commence grading at once.

The Champion Rivet Company of Cleveland, Ohio, have completed a shipment of 75 tons of Victor rivets for the cruiser "Demolines." The Champion Rivet Company also have the contract for all the boiler rivets for the boilers for the 23 new vessels now being built by the American Shipbuilding Company. These rivets are to be used in large Scotch marine boilers, carrying from 200 to 250 pounds pressure. The largest diameter rivet is 1½ inches and the contract calls for about 200 tons of rivets.

It is reported that a large plant for the manufacture of steel freight cars is to be located somewhere along the Monongahela River in the Pittsburgh district. The report, however, has not been confirmed.

The Iron Age

New York, Thursday, November 8, 1900.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.
JOHN S. KING,	- - - - -	BUSINESS MANAGER.

Favorable Trade Conditions in Home Markets.

Seldom have general conditions been more favorable for a large volume of business. To this state of affairs a number of special influences have contributed. These influences have all co-operated in reducing the supply of iron and steel, while some of them have also temporarily checked the demand, thus working both ways. The time is now at hand when the demand will no longer be restrained, but buyers will permit themselves to cover their requirements and capitalists will make long contemplated investments involving the consumption of iron and steel. Prominent among the influences that have checked trade were the very high prices prevailing at the opening of this year. These high prices caused many improvements or new enterprises to be postponed for cheaper times. The building trade suffered not only in the cities but in small towns. Building materials were too dear for both large and small undertakings. The building record of this year will be one of the smallest of the decade, possibly falling below the panic years.

Another great influence in checking business was the overbought condition of all consumers of iron and steel for more than half of this year. They were eager to secure abundant supplies while prices were climbing last fall, and placed contracts for enough to last them for nine months to a year. Until these supplies were exhausted they could not be expected to buy more, particularly as the world's famine in iron and steel had in the meantime been relieved.

Other depressing influences were the wages disagreements during the summer months, which caused numerous manufacturing establishments to be closed, many of them for fully three months and others even longer. Another quite potent factor in checking business was the Presidential election, which induced considerable caution.

Every one of these disturbing influences has now passed. Some of them have actually cured themselves. Prices, instead of continuing excessively high, have receded, the drop in some instances having been so very great that a reaction is already seen toward a higher level. The contemplated enterprises postponed when prices were very high can no longer be delayed on that ground, and may confidently be expected to gradually take shape. Building material having fallen to normal values, the coming building season will in all probability be unusually active. The long period of waiting for stocks of pig iron and other products in consumers' hands to be exhausted or for their contracts to terminate has given way finally to urgent orders all along the line for prompt shipments. The strikes are about over, those still pending being of a local character and in no case involving many workmen.

With the passing of these deterrent influences, the tide of business has for some time been rising. In certain lines it is running to flood, as in the tin plate trade. During the long stoppage of the mills the stocks of tin plates were run lower than for many years, and the manufacturers are now unable to satisfy the necessities of

the trade. From present appearances it will be a long time until tin plate stocks are put in normal condition. The wire trade is another branch in which great activity prevails. Merchants have for a long time been buying wire nails and wire in small quantities, fearing to carry stocks to any extent, but the consumption steadily increases, and their orders have been growing larger and larger despite the feeling of caution which would make them reduce purchases if they could. The wire manufacturers have done an enormous business the past month, rivaling that of the boom period.

The pig iron situation is ripe for a heavy covering movement among consumers who have been dallying with the manufacturers since the expiration of their contracts, buying only from hand to mouth. Important furnace interests state that until the last two weeks they have less tonnage entered on their books for future delivery than during the 1896-7 depression, nearly all their current business being for quick shipment. They are not exceptional in this respect, but have plenty of company. A little more confidence injected into consumers will greatly stimulate the buying movement, which seems to have developed the past week or two in the various trade centers. The rail manufacturers are confident that the railroad companies will need large quantities of rails next year, and will not be surprised if the tonnage comes up to that of the best year known. They are also expecting a heavy export trade. Of all great consuming interests, the agricultural implement manufacturers are practically alone in not taking a rosy view of the future, owing to short crops in the Northwest. Even they, however, are making fair preparations for the coming year and may be heavy buyers in the spring.

Comfortable Workshops.

With the beginning of winter the employer in any line of manufacturing in which the pay roll is a factor of consequence will find it profitable to give serious thought to the problem of making his shops as comfortable as circumstances will permit. Consideration for his employees need not, of necessity, influence his judgment or shape his action in any degree. Whether it should or not is a matter of opinion, but in any case he would do well to avoid anything like ostentatious altruism. The best results will come from a strictly practical consideration of what will promote his own interests and earn the largest profit. A judicious and even liberal expenditure in correcting or modifying conditions which render even willing workmen incapable of rendering good service will usually be found a substantial economy. In dealing with well paid labor minutes count and a very small variation in the average productiveness of a day's work will often make all the difference between profit and loss. It is a mistake to suppose that the success of a manufacturing business depends wholly upon what is done in the office. The best laid plans of the management often miscarry for no better reason than that the machinery of production fails to respond to the demands upon it, and costs are increased by causes not foreseen or provided for.

Few workshops are comfortably heated in cold weather. Most of them are much too cold to permit a man clothed suitably for his employment to keep his physical energies toned up to the demands of a full day's work. This will be shown very conclusively and at small expense by a brief experiment of putting the clerks and accountants to work in a temperature between 30 and 40 degrees F. The average workman in a cold shop cannot maintain through nine hours the energy

needed to keep him warm, becoming exhausted long before his day's work is finished. A man whose feet are benumbed and whose hands are paralyzed by frost becomes dull witted, apathetic and incapable of sustained effort, for the reason that the sluggish circulation robs the brain of the blood which it needs to sustain its action. He approaches the end of his day's work sleepy, ill natured and physically exhausted, his nerves relaxed and his muscles flabby. To restore his normal tone needs more than a night's rest. The through and through chill of the day's exposure makes him long to stimulate his low pulses by any means at hand, and alcohol is the readiest expedient available. A man who feels that "the genial current of his soul is froze" is not always discreet in the selection of the means of thawing it.

When it can be done a workshop should be kept as near an average temperature of 60 degrees as possible. The fuel cost of doing this is usually much less than the resulting advantages are worth. If the arrangements are designed and executed under the direction of an expert. Amateur work in shop heating is usually expensive and unsatisfactory. In many important industries shop heating is impossible. This is true of most metallurgical plants, where the nature of the operations carried on involves abrupt transitions from out of door temperatures to blistering local heats. It should be remembered, however, that such transitions are extremely trying to the physical system, and, being inevitable, they suggest the advantage of making such provision as is possible for the comfort of those who remain at the works through the noon hour. They should at least have a warm, well ventilated and comfortable place in which to pass this interlude, with restful chairs and steam pipes so disposed that those who want to warm their feet can do so. The man who has no other place to eat his dinner than a drafty corner of the mill and nothing better to sit on than an ingot mold or a sand pile does not return to his work when the whistle blows rested or refreshed, and his value for the remainder of the day is a steadily diminishing fraction of his normal capacity.

In some large works the interesting experiment of running a restaurant for the men is now being tried, with every promise of good results. The daily bill of fare is simple, consisting of coffee, hot soups, meat stews and baked puddings. The charges per portion, which are adjusted to cover cost, range from 1 cent for coffee to 5 cents for the meat dishes. In one instance the charge is a trifle higher, but any profit remaining after the expenses of the restaurant are met is turned quarterly into the sick benefit fund. The hot lunch plan is one which commends itself to approval where the conditions permit. Many of the men who formerly went home or to nearby saloons and restaurants now remain at the works and find it both agreeable and economical. They get better and more nourishing food at less cost than before. In cold weather a comfortable and leisurely midday meal, hot and gustatory, quickens the sluggish pulses and puts a man in condition for the afternoon. If run on a plan at all suggestive of charity soup house the self respecting wage earner would resent it, and he would not be content to be fed at his employer's cost. A shop restaurant should be expected to pay its expenses and ought to be discontinued if it fails to do so. The profit to the employer should be in the increased efficiency of those benefited.

The winter output of a shop of any kind depends a great deal upon how it is lighted. During the short and dark days from November to April a great deal of time is lost by reason of the fact that the men cannot half see what they are doing. Artificial light is steadily cheapen-

ing; but, whatever its cost, it is cheaper to have it than to do without it, if work is to be done. The economizing of light is as great a business mistake as its waste. How to light a shop so as to secure the best results from a given expenditure is a problem for the expert, but it is usually left to millwrights and superintendents who know little about it.

In the matter of toilet facilities conditions vary so widely that it is difficult to generalize. Much depends upon the class of labor employed, the number of men to be accommodated, the nature of the work performed and other conditions. Good sanitation pays under all circumstances. Generally speaking, it is a wise business policy to give the men as good toilet facilities as they will use properly. When different classes of men, having widely different tastes and habits, are brought together in a great industrial organization distinctions exist which should be recognized. We know of one interesting experiment in this line which may be suggestive to employers. The establishment in which it was tried is a large one employing several classes of labor. It was long ago obvious that nobody was suited by a system which brought all classes together in common wash rooms. The officers of the company thought the matter over and decided that what was good enough for the rougher element, who in other shops had been used to a bucket of water, a cake of yellow soap and a bunch of misappropriated waste for a towel, was insufficient and unsuitable for the better class of mechanics and engineer apprentices, many of whom had the social standing of gentlemen. The result was the erection of a detached frame building, simply but sufficiently fitted up with the facilities for a toilet, including clothes closets, wash basins and shower baths. To twelve men, representing the element who instinctively shunned the sinks in the rush of closing, the proposition was made that if they would form a club of 100 of their own choosing, to be governed by their own rules, they could have the use of the building at the pleasure of the company. The conditions were that they should pay for light by meter measurement and for heat and hot water what the fuel cost. They must also employ a competent and faithful porter, who would keep the place clean and orderly, and provide whatever they used in the way of soap, sponges, towels, &c. The club was formed, with dues of 20 cents per week, each member inclosing the money in a pay envelope bearing his name and date and dropping it in a box on pay day. This gave an average income of about \$19 per week, the club not being always full. It has met all expenses and left a small surplus, which is from time to time reduced by the remission of dues. The plan works admirably. Membership in what is known in this works as "the Dudes' Club" is something of a distinction. Its influence has been felt throughout the works. We can very well understand that there are many establishments in which this plan or any modification of it would be impracticable; but it is needed in many places where it has not yet been tried. To recognize differences in tastes and habits and encourage whatever makes for the upbuilding of self respect and commands the respect of others works like the university settlement in the slums, by establishing a sphere of influence which is elevating and improving.

The Hammond Mfg. Company, Limited, of Hammond, La., have been incorporated with a capital stock of \$10,000, with privilege of increasing to \$50,000, to manufacture Galvanized Roofing and Siding, Steel Ceilings and a general line of Galvanized Sheet Metal and Tinware products. The officers of the company are G. E. Dunn, president; J. W. Sentell, vice-president and treasurer, and T. G. Davidson, secretary and general manager.

An Increase of the Navy.

WASHINGTON, D. C., November 6, 1900.—Secretary Long, who will return to Washington in a few days to prepare his report to Congress, has now upon his desk the outlines of three plans looking to the further increase of the navy, which he will carefully review before sketching that feature of the President's message to Congress which is usually roughly drafted in the Navy Department. The first of these plans has been prepared by the Construction Board of the Department, which is composed of the various bureau chiefs, this plan providing for no less than 32 new ships. The second scheme of enlargement is the work of the so-called Policy Board, headed by Admiral Dewey, and embraces a dozen or 15 new vessels, mostly cruisers. The third plan is supplemental to that of the bureau chiefs, and has been evolved by Admiral Hichborn, the chief constructor, and provides for a number of vessels specially designed for certain important functions in connection with naval operations at a considerable distance from the coasts of the United States.

While Secretary Long has been very reticent concerning his probable recommendations to Congress in the way of increasing the navy, he has not hesitated to say that he would not ask for as many additional vessels as the Department recommended a year ago, and hence there is much interest felt in naval circles as to how the Secretary will apply the pruning knife to the plans now before him. The understanding is current that with the exception of certain auxiliary vessels projected by Admiral Hichborn, but approved by the Construction Board, the Secretary will ask Congress to appropriate at the coming session for nothing larger than a gun boat. This will be very disappointing to the bureau chiefs, as well as to the line and staff, but Secretary Long is very much in earnest in his effort to reduce expenditures on account of the navy to a peace footing as soon as possible, and he does not intend that retrenchments made by the Department shall be offset by an unnecessarily large construction account.

The plans of the Construction Board embrace 6 cruisers, 20 gun boats, several armed colliers and a floating machine shop similar to the "Vulcan." It is proposed that the cruisers shall have a higher rate of speed than any heretofore designed, and the suggestion has been made that several of them shall be equipped as "torpedo cruisers," an entirely new type of war vessel, having a displacement of at least 4000 tons and carrying primary batteries of 8-inch guns in addition to a full equipment of torpedoes, including the automobile pattern. Such vessels, capable of outsteaming any vessels of equal tonnage in the world, and able to throw a very heavy weight of metal if compelled to fight, would, it is urged, prove very formidable craft, and would be available either for harbor defense or for operations in connection with large fleets on foreign stations.

As Secretary Long has intimated that he will indorse the recommendations for a number of gun boats, considerable interest is felt in their design and equipment. They will range in size from 1800 to 3500 tons, and will combine two important characteristics, the lightest possible draft with the heaviest rapid fire batteries that can be provided without detriment to their sea going qualities. They will also be provided with unusually large bunker capacity, the Construction Board now keeping constantly in view the importance of designing ships capable of making the trip from the Pacific Coast to the Philippines without coaling en route.

Coaling Vessels.

The problem of coaling fleets on foreign stations is becoming a more important one, as experience demonstrates the poor quality of the fuel to be had in the Orient. Naval commanders use Japanese coal only when obliged to do so, and the coal to be found in the Philippines is said to contain so much sulphur as to be most undesirable for use on any sea going vessel. Considerable attention has already been drawn to the fact that the army transports, which are under the exclusive jurisdiction of the War Department, have been seriously damaged as a result of the use of Oriental coal under forced draft, and naval experts predict that the army will be obliged ultimately to secure all its coal from other sources. In order to meet this condition of affairs it is expected that the Navy Department will soon provide for the construction of four or five armed colliers capable of carrying 10,000 tons of coal from the Atlantic Coast to the Philippines at a fair rate of speed. Three colliers have been decided upon, and will be armed to take care of themselves in an encounter with anything less formidable than a first-class cruiser or battle ship.

A Repair Ship.

The Construction Board has agreed to recommend a 6000-ton repair ship on the lines suggested by Admiral

Hichborn in his annual report recently printed in *The Iron Age*. It is not believed that it is practicable to use any vessel now in the navy, or that can be purchased, for this work, owing to fundamental structural defects. An unusually high between decks is required to provide for the installation of all necessary tools and for power transmission, proper lighting and adequate ventilation. Admiral Hichborn is of the opinion that such a vessel, kept constantly in commission, would pay for itself in a very short time in the difference between the cost of repairs made on board her as compared with the charges of private shipyards, leaving out of account the difference in the character of the material and workmanship. It is believed that Secretary Long will include the floating machine shop and several armed colliers in his recommendations, though it is probable that the torpedo cruisers and other vessels larger than gun boats will be eliminated.

W. L. C.

American Competition in South Africa.

LONDON, October 26, 1900.—There is no end of a pother over here on account of orders coming from South Africa to American manufacturers for railway engines, trucks and mining machinery. The air is thick with assertions and denials; the Colonial Office is bombarded with furious protests, and an evening paper quotes *The Iron Age* as having special information on the subject. Denials notwithstanding, English engineers know quite well that orders are going to America because there is prompter delivery and American prices are cheaper than English. For example, the Witwatersrand gold mines, requiring rolling stock for the carriage of coal, placed an order for 15 heavy locomotives with British manufacturers last August. Two tenders for over 200 trucks were also received from the largest British and American factories, the tenders from America being preferable as regards price and quickness of delivery. But South Africa is, at the present time, suffused with an unusual quantity of imperialism, and accordingly the mining magnates called for fresh tenders from the British manufacturers so that they might level down their prices. But the American tenders still remained considerably lower. In spite of this, orders for 73 flat bottomed trucks went to England on the strong advice of the British military railway authorities, but orders for 160 bottom discharge trucks have been placed with America. It is necessary to bear in mind the distinction between the Government authorities and private buyers. The Agent General in London for the Cape Colony writes that the expenditure on railway material in England for the period January 1, 1897, to September 30, 1900, amounted to nearly \$20,000,000. Orders are at the present moment outstanding amounting to \$2,500,000. During the same period orders sent by the authorities to the United States have amounted to \$1,400,000. The Agent General remarks that most of this amount has been on account of subcontracts and that the colony has always given a preference to the British manufacturer. The Agent General adds: "The Cape Colony send their orders direct to America through an agency in New York whenever the necessity demands it, and this necessity is urged by the desire for dispatch and economy, and not in consequence of alleged anti-British tendencies of the Cape officials." This diplomatic denial notwithstanding, there can be no doubt that America is undertaking large contracts in South Africa. In March, 1899, six improved Pullman cars were supplied to the Cape Government railways. In July, 1900, several Baldwin locomotives were delivered at Cape Town in part completion of Cape Government contracts, and there are still several engines ordered in America as yet undelivered. Dickson & Co. of Philadelphia have supplied four engines, and at the present moment the Union Switch & Signal Company of Pittsburgh have in hand orders from the Cape Government railways, while several side tank engines from the Baldwin Works are just about to be delivered at Cape Town. The Pressed Steel Car Company, Pittsburgh, have an order from the Cape Government of several steel platform cars of 40 tons capacity. It is perhaps unnecessary to discuss the matter further. There cannot be the slightest doubt that until British manufacturers standardize their patterns and prepare for their orders beforehand American makers cannot fail to secure remunerative contracts from South Africa and elsewhere. The ups and downs of the South African war are so kaleidoscopic that it is probable that by the time this dispatch reaches New York there will be some unexpected development, but writing on October 27 there is every appearance that the war will continue for some lengthened period, the Boer farmers having decided upon adopting guerrilla methods. This will keep the country in a state of disorder and retard business development. There cannot be any doubt, however, that Colonel Girouard has a warm corner in his heart for American engineers.

S. G. H.

MANUFACTURING.

Iron and Steel.

A meeting of the stockholders of the Laughlin Nail Company of Wheeling, W. Va., will be held on Tuesday, November 20, for the purpose of voting upon a proposition that the company shall engage in the manufacture of wire nails on a large scale. There seems to be no doubt that this concern will install a large number of wire nail machines.

The Altoona Iron Company, Altoona, Pa., manufacturers of refined bar iron, advise us that some of their puddlers have refused to accept the reduction in the puddling rate from \$4.25 to \$3 a ton, and have been paid off. This concern for more than 25 years have had an agreement with their men to pay Eastern prices for puddling, and in making the reduction from \$4.25 to \$3 they were simply carrying out this agreement. The finishing mills are all running and will continue to do so. The firm have considerable muck bar on hand, and will purchase more if necessary. This concern will likely put up some new buildings in the near future to replace some present ones which are very old and virtually worn out.

The National Steel Company will make some more enlargements and improvements to the Ohio Works at Youngstown, Ohio. Two new steel buildings will be erected and one of the present buildings will be extended. The Fort Pitt Bridge Company of Canonsburg, Pa., have the contract for this work. The George B. Sennett Company, Youngstown, will furnish table and shears, the Century Machine & Mfg. Company, Mansfield, Ohio, screw bed and hot bed plates, while the Lloyd Booth Company of Youngstown will furnish a lot of special machinery for the billet conveyors in the steel plant.

The Bradford Steel Company will erect a small plant at Bradford, Pa. The buildings have been placed with the Fort Pitt Bridge Company of Canonsburg, Pa.

The Eagle Works of the Republic Iron & Steel Company at Ironton, Ohio, which have been idle for some time, have been put in operation in all departments.

The Northwestern Iron Company's blast furnace at Mayville, Wis., resumed operations on October 30.

R. G. Caldwell has been appointed trustee in bankruptcy for the Kentucky Furnace Company, Paducah, Ky.

The Brown-Bonnell Works and the Valley Works of the Republic Iron & Steel Company at Youngstown, Ohio, are now running to full capacity. As yet the Haselton Works at Haselton have not been started up, and may remain idle for some time.

A coupling and socket department is to be added to the Youngstown Works of the National Tube Company at Youngstown, Ohio. Heretofore couplings have been made at the other works of the National Tube Company and then shipped to Youngstown, but in the future it is intended to make all couplings needed for the Youngstown Works at that plant. The new department will be contained in a building to be erected southeast of the present plant and to measure 40 x 230 feet, having a floor capacity of over 10,000 feet. There will be a small building, 16 x 60 feet, to contain a Duff's gas producer; new forges, hammers, shears, tipping machines and two Seaman gas furnaces will also be installed in the Youngstown Works. Every department of this plant is now in full operation and is in charge of W. L. Kaufman, manager.

The Buffalo Union Furnace Company of Buffalo, N. Y., with a capital of \$1,200,000, have been incorporated. The company will manufacture pig iron from iron ores and products of pig iron into iron and steel of various forms. The Buffalo Union Furnace Company are a consolidation of three furnace properties consisting of the Buffalo Furnace Company, the Union Iron Works and the Buffalo Charcoal Iron Company. The directors are as follows: Frank S. Baird, Henry J. Pierce, Herbert P. Blissell, George C. Riley, J. Henry Metcalf, Samuel H. Baird and William J. Jameson, all of Buffalo. Frank S. Baird will be general manager.

The contract has been let for the foundations of the four new blast furnaces of the Lackawanna Iron & Steel Company at Buffalo, N. Y.

The Antrim Furnace of the Antrim Iron Company, Mancelona, Mich., was blown out October 20. It is to be blown in during December.

The Lawrence Furnace at Ironton, Ohio, belonging to the John Peters Iron Company, is to be blown in during the present month.

Furnace A of the Maryland Steel Company, Sparrow's Point, Md., was blown out October 20, for relining.

The Kittanning Iron & Steel Company, Kittanning, Pa., blew out their Rebecca Furnace October 13.

A new lining is being put in the Chatham Furnace, Connecticut.

The Cherry Valley Furnace of the Cherry Valley Iron Works, Leetonia, Ohio, went out of blast on October 19 for a new lining.

The Cranberry Iron & Coal Company, Cranberry, N. C., blew out their furnace on October 8.

The Anna Furnace of the Struthers Furnace Company, Cleveland, Ohio, has been blown out.

C. R. Baird & Co., Philadelphia, Pa., have banked the Chickies Furnace and the Emporium Furnace in Pennsylvania, and the Roanoke Furnace in Virginia.

The National Steel Company have blown out their Zanesville Furnace and their Sharon Furnace.

The Saxton Iron Company, Saxton, Pa., have been reorganized, under the name of the Saxton Furnace Company. All the property of the former concern, together with the properties of the Dry Hollow Ore Company, have been absorbed by the new company. Charles H. Scott has been elected president and E. W. Porter secretary and treasurer, with offices in the Manhattan Building, Philadelphia, Pa. It is expected that the furnace will be in blast by December 1. L. & R. Wister & Co. will be the Philadelphia sales agents for the pig iron.

The Seaboard Steel Casting Company of Chester, Pa., Hon. William C. Sprone, president, are nearing the finishing point. The furnaces will soon be lighted and there are orders on the books for December and January delivery.

Machinery.

The Marinette Iron Works, Marinette, Wis., are making plans for the enlargement of their shops. They manufacture a gas engine of new design, for which they have built up a heavy trade. The plans contemplate more than double the capacity of their present facilities.

The Richer-Clark Mfg. Company will erect a wagon factory and machine shop, at Greentown, Howard County, Ind.

The Hartman Mfg. Company of Pittsburgh have been granted a West Virginia charter with a nominal capital of \$1000. The new concern will make center plates and small castings.

The Aultman Company of Canton, Ohio, have shipped a 40-ton charging device to the Carnegie Steel Company. A rock crusher was recently shipped by the same firm to New Mexico. Their plant is running full, and they have a large number of orders on hand.

The Lloyd Booth Company, Youngstown, Ohio, manufacturers of rolls and rolling mill machinery and tin plate equipment of all kinds, are operating their machine shops night and day. The firm were recently compelled to post notices about their plants for machinists. There is something of a scarcity of skilled labor in Youngstown, and it was some days before the firm could get sufficient men to make full night crews.

The Mahoning Foundry & Machine Company, Youngstown, Ohio, advise us that the report that they would remove their plant from Youngstown to Niles, Ohio, is untrue. The concern state that their business has grown to such an extent that they will soon have to build a much larger plant, as they are very much crowded in their present quarters. They regard indications very good for a steady run of work such as they turn out.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, manufacturers of rolls and rolling mill castings, are crowded with work and have enough contracts to keep them busy for some months. This concern are now occupying their new machine shops, which were added to the plant last summer, with the exception of a large planer and lathe. All machinery is set up and running.

The Fort Pitt Bridge Company recently installed in their works, at Canonsburg, Pa., a 10-ton three-motor electric traveling crane, made by the Northern Engineering Company, Detroit, Mich.

The Browning Engineering Company of Cleveland are erecting a plant in Collinwood, a suburb of that city, and will manufacture hoisting machinery. Twelve acres of land were given to the concern on the condition that they employ 700 men. The officials are B. F. Miller, president; V. R. Brown, vice-president, and E. H. Browning, secretary.

The Waynesburg Forge, Sheet & Tin Mills, whose plant at Waynesburg, Pa., is in course of construction, have placed a contract with the Canton Roll & Machine Company, at Canton, Ohio, for one 22-inch bar mill and pinion complete for rolling tin plate bars out of billets, and also for a 126-inch sheet shear. The N. & G. Taylor Company, Cumberland, Md., have also a contract with the same concern for a 22-inch cold rolling mill and one 48-inch roll lathe. The Tyler Charcoal Iron & Tin Mills, Washington, Pa., have also given to this concern an order for one 26 x 32 hot mill and one 42-inch doubling shear; from the Champion Iron & Steel Company, Muskegon, Mich., for two 26 x 36 hot mills and two 42-inch doubling shears. Shipments of machinery from the works of the Canton Roll & Machine Company last month were the heaviest in any one month in the history of that concern.

The Gulf Motor Works, New Orleans, La., were commenced in May last for the manufacture of marine and stationary gas and gasoline engines and report that they are making good progress. They are at present developing a multiple cylinder engine for domestic electric light plants.

R. Stienert & Co. are building a foundry and machine shop at Washburn, Wis. The machine shop will be completed first, occupying a ground space, 32 x 62 feet.

We are advised that it required 7000 cubic yards of sand to cover the floor in the new foundry of the Morgan Engineering

Company, at Alliance, Ohio, which was started last week. The foundry is fitted with three cupolas, and is served by seven electric overhead traveling cranes. It has been built with special view of good light and ventilation, and fitted with most modern equipment for foundry practice. Natural gas is used for heating the core ovens, and in fact, natural gas is used as a fuel throughout the plant and with very satisfactory results.

The Hess Machine Company, Philadelphia, Pa., shipped a few days ago to Yokohama, Japan, a complete plant of file making machinery, having a capacity of 125 to 150 dozen files per day. This consignment was for the Japanese Government.

John Nazel, Philadelphia, Pa., now has associated with him F. C. Hulme, and they are continuing the manufacture of special machinery and machine tools, under the name of the Nazel & Hulme Machine Works. They have recently completed a number of paper box machines for local delivery. These each have a capacity of 1200 to 1500 complete boxes per hour. A number of their special portable drills have also been recently delivered.

The Interstate Foundry Company, Cleveland, Ohio, have recently been incorporated with a capital stock of \$400,000. Buildings are being erected, and the company expect to be ready for business January 1.

Fire occurred at the foundry of the American Play Working Machine Company, at Willoughby, Ohio, on Saturday, October 27. The foundry and contents were entirely destroyed, the loss being estimated at \$13,000, fully covered by insurance. The foundry will be rebuilt at once and equipped with modern appliances. A 60-inch cupola and a 20-ton electric crane will be included in the equipment. Pending the construction of the new foundry the American Play Working Machine Company will make their necessary castings at one of the other foundries which they operate.

Since removing in 1898 to their present enlarged quarters the Toledo Machine & Tool Company of Toledo, Ohio, have added largely to their equipment, and have more than trebled their capacity for producing punch presses and special tools for sheet and bar metal work. During the present year they have given considerable attention to the requirements of shovel manufacturers, and have installed several large plants for this purpose, among others that of the Laughlin Nail Company, at Martin's Ferry, Ohio. The Toledo Machine & Tool Company are now negotiating for the equipment of another plant for shovel manufacturing which will have considerable more capacity than any now in operation in this country.

The Bridgeport Machine & Motor Company have been incorporated with a capital stock of \$25,000. The incorporators are A. B. Barkman, E. T. Brantigan, H. H. Brantigan and B. C. Hendrickson.

Gould & Eberhardt, with principal office at 97 N. J. R. R. avenue, Newark, N. J., have been incorporated with a capital of \$100,000 for the manufacture of tools, machinery, &c. The incorporators are Ulrich Eberhardt, Z. Ulrich Eberhardt, Jr., Frederick L. Eberhardt and Henry E. Eberhardt.

The White Motor & Machine Company of Waltham, Mass., have been incorporated in Delaware, with a capital of \$25,000.

Charles Leffler & Co., Brooklyn, N. Y., have been incorporated for the manufacture of machinery, with a capital of \$50,000. The directors are Charles Leffler, F. E. Gundrum and E. T. Kircher of Brooklyn.

The Acme Mining & Machinery Company of Salt Lake City, Utah, have been incorporated with a capital of \$30,000. The business of the incorporation is to buy, sell, lease and manufacture and deal in machinery. The headquarters of the company will be located at 327 South West Temple street. President, A. W. Stevenson; vice-president, E. P. Sears; secretary and treasurer, A. B. Stephens.

The Soule Steam Feed Works, Meridian, Miss., who are manufacturers of saw mill specialties, have had a very satisfactory trade this year. They have always aimed to keep adding to the number of their specialties. The most recent addition is a steam log loader, the particular feature of which is that it comes in between the very expensive loaders that cost several thousands of dollars and the primitive methods of manual or animal power, its cost being only a few hundred dollars. While the bulk of the trade of the house is confined to the Southern lumber field, they have lately filled two steam feed orders for the Dominion of Canada, four for the State of Michigan and several for the mountain districts of the Pacific Coast.

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., report a phenomenal demand for the Pittsburgh safety water column, particularly from manufacturing plants in Ohio and Michigan. Among the orders received the past month for this appliance are the following from these great companies, who are equipping their plants complete with the Pittsburgh: The American Sheet Steel Company, 95; the American Steel & Wire Company, 72; the Lake Shore & Michigan Southern Railway, 80; the American Steel Hoop Company, 61; the Crown Fire Clay Company, 24; the Structural Steel & Iron Works, 20; the Ohio Steel Company, 20; Fleischman Company, 12; Erhart & Co., 12; Cincinnati Water Works, 12; the Youngstown Steel Company, 10; Hoover & Allison Company, 10.

The Morgan Engineering Company of Alliance have secured a

contract for what is said to be the largest crane ever exported. It will have a span of 96 feet, the size being so great that it will be necessary to cut the girders in two for shipment. The crane will go to India. The Morgan Company are at work on cranes for Russia, India, Mexico, France and Cuba.

Reeves Brothers, Alliance, O., have commenced work on an addition 76 x 96 feet, to be used as a power house, and have placed contracts for engines, boilers, generators, &c. The entire plant will be changed to electric drive.

The Vincent Valve Company have commenced operations on a new plant at Sandusky, Ohio. E. C. Bacon is general manager of the company.

The Beardsley & Hubbs Company of Mansfield, Ohio, carriage manufacturers, have gone into the manufacture of gasoline automobiles and are equipping a plant with new machinery.

Hardware.

The Rogers & Wood Company, Northampton, Mass., have organized under the laws of Massachusetts for the manufacture of reinforced silver plated flatware. The officers are E. E. Wood, president; George F. Rogers, secretary; W. H. Gaines, treasurer and manager. The members of the firm are practical men and well known to the trade. Mr. Gaines was for a number of years connected with Rogers & Hamilton, Waterbury, Conn.

The Ford Bit Company, Holyoke, Mass., manufacturers of the Ford auger bits and ship augers, have moved to larger quarters on Bigelow street, and have added new machinery which will greatly increase their output.

The Snelljohn & Seefeldt Company, manufacturers of hardware specialties, Milwaukee, Wis., have purchased a large tract of land along the Chicago, Milwaukee & St. Paul Railroad, between Twenty-fifth and Twenty-seventh streets, for the purpose of building a large plant to increase their manufacturing facilities.

The Cincinnati Foundry, Screen & Wire Works, J. H. Shrader & Co., proprietors, Cincinnati, Ohio, have purchased the plant located at 1962-1966 Queen City avenue, formerly operated by Dohner Brothers, and are now engaged in making the necessary alterations and additions of new machinery for the production of wire and iron fencing, bank and office railings, elevator cabs and inclosures, flower stands, weather stripping, &c. A catalogue is now in course of preparation, which will be sent to the trade upon request.

The Nicholson File Company, Providence, R. I., advise us that they have recently been receiving stock orders of larger volume, indicating the confidence of the trade and the satisfactory character of business.

Dublin Hame Works, Dublin, Ga., have reorganized, and are now operating under an entirely new management. T. B. Hicks has been elected president of the concern; J. B. Hicks, vice-president, and J. C. Pelmon, treasurer. All kinds of oak, elm and hickory hames are made.

Miscellaneous.

The Nut & Washer Mfg. Company, South Bay and Reynolds streets, Milwaukee, Wis., have completed important additions to their plant and are now erecting a brick office building.

The Northern Pacific Railroad Company will build new shops at Brainerd, Minn., the steel work of which will be furnished by the American Bridge Company.

The Structural Iron & Steel Company of Baltimore, Md., have the contract for furnishing the structural steel for the new manual training school at Washington, D. C. The same company have the contract for furnishing the structural material for a new power house at Georgetown, S. C.

A number of improvements are being made to the Youngstown Works of the American Bridge Company at Youngstown, Ohio. Ten cranes of a capacity from 6 to 20 tons each, operated by compressed air, are being installed, and also a new gas engine driving a belted compressor, in order to provide the necessary power. This plant has also received several other new machines from the Economy plant of the Berlin Iron Bridge Company, for whom they were originally intended, but which were afterward transferred to the Youngstown plant, and which has about doubled its capacity. It will be recalled that previous to the formation of the American Bridge Company the Berlin Iron Bridge Company at East Berlin, Conn., intended to erect a very large plant at Economy, Pa., on the line of the Pittsburgh, Fort Wayne & Chicago Railroad, about 20 miles from Pittsburgh. When the American Bridge Company was organized, however, this plant was abandoned.

The New Orleans Roofing & Metal Works, New Orleans, La., have just finished a contract for a tropical roofing for the John Rice Mill Company, Beaumont, Texas, and the new Cora Sugar Refinery, Whitecastle, La. They have also done the galvanized iron work and composition roofing on the Sacred Heart Convent and the Jesuits' College building in New Orleans and the roofing of the Hancock County Bank, Bay St. Louis, Miss.

An Ohio reaper and mower manufacturing concern have made a proposition to the city council of Upper Sandusky for the organization of a new company with \$200,000 capital to build reapers and mowers. The company ask \$20,000 bonus, 25 acres of land, and they agree to employ 100 men and to remain 15 years.

The Iron and Metal Trades.

As yet it is too early to attempt to gauge the effect of the election upon the Iron trade. Many hold that the result has removed the fear of a serious danger rather than that it has introduced a new element. But, even assigning to it so purely negative a value, it is highly beneficial by giving play to the many and powerful influences which have been making for a long period of activity at fairly remunerative prices for our home markets. So far as the export trade is concerned, we must look forward to a sharp struggle, since advices from Europe show a continued sharp reduction in consumption.

The past week has been an active one, the policy of discounting the election having spread. Heavy sales of Pig Iron are reported from all the leading distributing centers and during the closing days of October fully 30,000 tons of Basic Iron were sold in the Philadelphia district. Chicago reports very large transactions and Cincinnati records the banner week for the whole year.

It is yet, of course, too early to judge to what extent the election has thus been discounted in this branch. It is certain that some options have been granted which ran beyond the election, and these will probably be availed of. The impression in the trade is that a very large amount of tonnage is still uncovered, and quite a number of sellers have withdrawn or are asking an advance. Whether developments will justify the first enthusiasm remains to be seen. The general situation certainly is very sound and promising.

In the finished trades Western reports record heavy purchases of Bars, Sheets, Wire, Tin Plate, Merchant Pipe, &c., and note an advancing tendency. Reserve capacity is being drawn on steadily. In the Plate trade prices have settled down to those established by the association. The tonnage on the books of the mills must be enormous. One large interest gave out orders for 35,000 tons last week.

In the Structural trade some very good business has been coming up. In New York contracts for the material for three buildings are placed which call for close to 8000 tons. The Philadelphia & Reading road has ordered 3000 tons of bridge material, while the Chicago, Rock Island & Pacific has placed 3500 tons.

What promises to become a very important and decisive gathering is that of all the Steel interests this week. It is probable that data will be available to shed light on the many perplexing questions involved in handling the Steel Billet trade. The large interests are reported to be in earnest and are approaching the problem in a conciliatory spirit, so that strong hopes are expressed of a satisfactory outcome. It is stated that some very large consuming interests are approaching the time when important purchases must be made.

In the Rail trade there have been no new developments.

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

	Nov. 7, 1900.	Oct. 31, 1900.	Oct. 10, 1900.	Oct. 11, 1899.
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia.....	\$15.25	\$15.00	\$15.00	\$22.75
Foundry Pig, No. 2, Southern, Cincinnati.....	12.25	12.00	13.00	20.75
Foundry Pig, No. 2, Local, Chicago.....	14.50	14.50	14.50	23.00
Bessemer Pig, Pittsburgh.....	13.25	13.15	13.00	24.00
Gray Forge, Pittsburgh.....	12.75	12.75	12.75	21.00
Lake Superior Charcoal, Chicago....	17.00	17.00	18.00	25.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh.....	17.50	18.00	16.25	38.50
Steel Billets, Philadelphia.....	20.00	20.00	19.25	40.00
Steel Billets, Chicago.....	19.50	19.50	19.50	30.00
Wire Rods, Pittsburgh.....	33.00	33.00	33.00	46.00
Steel Rails, Heavy, Eastern Mill.....	26.00	26.00	26.00	33.00
Spikes, Tidewater.....	1.45	1.45	1.40	2.65
Splice Bars, Tidewater.....	1.25	1.25	1.25	2.25
OLD MATERIAL:				
O. Steel Rails, Chicago.....	10.00	10.00	10.00	20.00
O. Steel Rails, Philadelphia.....	15.00	14.00	12.75	21.50
O. Iron Rails, Chicago.....	16.00	16.00	15.50	35.00
O. Iron Rails, Philadelphia.....	16.50	16.50	15.50	25.00
O. Car Wheels, Chicago.....	15.00	15.00	17.00	20.50
O. Car Wheels, Philadelphia.....	16.50	16.50	15.50	21.00
Heavy Steel Scrap, Chicago.....	9.50	9.50	10.00	19.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia.....	1.25	1.25	1.25	2.10
Common Iron Bars, Youngstown.....	1.20	1.20	1.25	2.25
Steel Bars, Tidewater.....	1.25	1.25	1.25	2.40
Steel Bars, Pittsburgh.....	1.15	1.10	1.10	2.35
Tank Plates, Tidewater.....	1.38	1.35	1.25	3.00
Tank Plates, Pittsburgh.....	1.25	1.25	1.10	2.75
Beams, Tidewater.....	1.65	1.65	1.63	2.40
Beams, Pittsburgh.....	1.50	1.50	1.50	2.25
Angles, Tidewater.....	1.55	1.55	1.55	2.40
Angles, Pittsburgh.....	1.40	1.40	1.40	2.25
Skelp, Grooved Iron, Pittsburgh.....	1.55	1.45	1.40	2.10
Skelp, Sheared Iron, Pittsburgh.....	1.50	1.50	1.45	2.40
Sheets, No. 27, Chicago.....	3.05	3.05	3.05	9.15
Sheets, No. 27, Pittsburgh.....	2.80	2.80	2.80	3.10
Barb Wire, f.o.b. Pittsburgh.....	2.80	2.80	2.80	3.40
Wire Nails, f.o.b. Pittsburgh.....	2.30	2.30	2.30	2.80
Cut Nails, Mill.....	1.95	1.95	1.95	2.50
METALS:				
Copper, New York.....	16.75	16.75	16.75	18.37½
Spelter, St. Louis.....	4.00	4.00	3.95	5.35
Lead, New York.....	4.37½	4.37½	4.37½	4.60
Lead, St. Louis.....	4.25½	4.25½	4.27½	4.50
Tin, New York.....	28.00	27.85	28.75	31.90
Antimony, Hallett, New York.....	9.50	9.50	9.50	9.75
Nickel, New York.....	55.00	55.00	55.00	56.00
Tin Plate, Domestic Bessemer, 100 lbs., New York.....	4.19	4.19	4.19	4.82½

Chicago. (By Telegraph.)

Office of The Iron Age, 1205 Fisher Building, CHICAGO, November 7, 1900.

The local market has again been decidedly active. Consumers have taken hold particularly well in Pig Iron, but a great deal of business has also been closed in various lines of finished products. Numerous buyers, among whom are the largest consumers, evidently decided to wait no longer, but to anticipate an expected improvement in prices after the election. Car builders are still important factors in the market, but the agricultural implement makers, wagon builders, engine manufacturers, railroad companies and other great interests are placing orders liberally. Quite a difference of opinion prevails respecting the future. Some are sanguine that prices will be much higher, while others look for an exhibition of strength only for the present, to be followed by a decline. The believers in a stronger market appear to be greatly in the majority.

Pig Iron.—The past week has been one of the largest. If not the largest, this year in the tonnage of contracts placed. Chicago consuming interests have bought heavily for deliveries running into next July, while large Milwaukee foundrymen and numerous other consumers in this territory have also made heavy purchases. Some buyers have taken as much as 10,000 to 12,000 tons each, others have taken 3000 to 5000 tons. Many deals have been closed up which have been pending for a long time, but many more are still hanging over the market and are liable to be closed within a day or two. Quotations continue about as they have been, but it is difficult at present to determine precisely what rates are running the market. Some of the transactions are known to have been placed at extremely low figures, especially those involving the purchase of Southern Iron. It is possible that on some grades our quotations have been shaded to the extent of \$1. It is asserted now that these extremely low prices can no longer be secured, as the sellers have booked so much tonnage that they have withdrawn from the market. Some of the Southern furnace companies are quoting \$10.50, Birmingham, as their minimum, while others have a still stronger faith in the

future and are standing firmly at \$11.50. Quotations are as follows:

Lake Superior Charcoal.....	\$17.00 to \$17.50
Local Coke Foundry, No. 1.....	15.00 to 15.50
Local Coke Foundry, No. 2.....	14.50 to 15.00
Local Coke Foundry, No. 3.....	14.00 to 14.50
Local Scotch, No. 1.....	15.00 to 16.00
Ohio Strong Softeners, No. 1.....	16.00 to 16.50
Southern Silvery, according to Silicon.....	15.50 to 16.50
Southern Coke, No. 1.....	14.50 to 15.00
Southern Coke, No. 2.....	14.00 to 14.35
Southern Coke, No. 3.....	13.50 to 14.10
Southern Coke, No. 1 Soft.....	15.00 to 15.35
Southern Coke, No. 2 Soft.....	14.00 to 14.35
Foundry Forge.....	12.75 to 13.50
Gray Forge and Mottled.....	12.25 to 12.50
Southern Charcoal Softeners, according to Silicon.....	15.00 to 17.00
Alabama and Georgia Car Wheel.....	20.00 to 20.35
Malleable Bessemer.....	14.50 to 15.00
Standard Bessemer.....	14.50 to 15.00
Jackson County and Kentucky Silvery, 8 per cent, Silicon.....	18.00 to 19.00

Bars.—The largest manufacturers of both Iron and Steel Bars are becoming much more independent as their order books fill up. The aggregate of the business placed here since our last report has been very large, although the heaviest single sale reported was 4000 tons. Numerous orders have been entered for 1000 tons or more. The buyers include wagon manufacturers, car builders, railroad companies, and jobbers' prices are nimmer, owing to the withdrawal from the market of large manufacturers who refuse to name quotations at present. The Republic Iron & Steel Company are starting up additional mills to enable them to make more satisfactory deliveries on business now being taken; this week the Frankton mill, in Indiana, was started. Mill shipments of Common Iron are quotable at 1.30c. to 1.35c.; Soft Steel Bars, 1.30c. to 1.35c., and Hoops, 1.95c., base, Chicago. The demand from local stocks continues as heavy as ever, and jobbers are still complaining of difficulty in securing shipments from mills to enable them to keep up assortments. Store prices are unchanged at 1.65c. to 1.75c. for Common Iron, 1.50c. to 1.65c. for Steel and 2c. to 2.20c. for Hoops.

Billets.—Quotations on 4 x 4 inch Bessemer Billets are unchanged at \$19.50 to \$20. No transactions are reported in ordinary Billets, but sales have taken place of special Open Hearth Billets for axles amounting to about 6000 tons.

Structural Material.—Considerable business continues to develop from outlying towns, but the nearby building trade is as quiet as it has been. Car builders and manufacturers of railroad supplies have placed additional orders for Shapes, particularly Channels and Angles. Quotations, mill shipments, are as follows: Beams, Channels and Zees, 15 inches and under, 1.65c.; 18 inches and over, 1.75c.; Angles, 3 inches and over, 1.55c.; Angles, under 3 inches, 1.35c.; Tees, 1.70c.; Universal Plates, 1.40c. From local yards small lots of Beams and Channels quoted 2.15c. to 2.35c.; Angles, 1.80c. to 1.90c. rates, and Tees, 2c. to 2.20c.

Plates.—Manufacturers have not entered much new business at the advanced prices but quite a heavy tonnage has been booked on which quotations had been outstanding. Mill shipments of Tank Plates, ¼-inch and heavier, are quoted at 1.40c., Chicago; Shell, 1.45c.; Flange, 1.50c.; Marine, 1.55c. Jobbers are enjoying an excellent demand from store, quoting small lots at 1.60c. to 1.70c. for Tank and 2c. for Flange.

Sheets.—Another week of heavy business is reported by both manufacturers' agents and jobbers. The demand has been particularly large for Galvanized Sheets. Large buyers, who had been expected to wait until after the election, decided to hesitate no longer, but came into the market and covered their requirements. Mill shipments of No. 27 Black Sheets are quoted at 3.05c., Chicago, and Galvanized Sheets at 75 per cent. off. Jobbers in very few cases have full stocks of Galvanized Sheets; they have bought so conservatively that an improving demand has caught large houses with broken assortments. Small lots from store are quoted at 3.10c. to 3.15c. for No. 27 Black, 2.10c. to 2.20c. for No. 16, 1.85c. to 2c. for Nos. 10 to 14, and 70 and 5 to 70 and 10 off for Galvanized.

Merchant Steel.—Although season contracts are presumed to have been placed, an occasional buyer makes his appearance who has not as yet covered all his requirements. The current demand for small lots makes a good volume of business. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 1.75c. to 1.90c.; Smooth Finished Tire, 1.75c. to 1.95c.; Open Hearth Spring Steel, 2.15c. to 2.40c.; Toe Calk, 2.40c. to 2.60c.; Sleigh Shoe, 1.70c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 7c.; Specials, 13c. upward.

Merchant Pipe.—Jobbers are having a continued very

good demand, with continued scarcity in some sizes which are most frequently called for by the heating trade. Manufacturers' prices, random lengths, are as follows:

	In carloads.	Less than carloads.
	Blk. Galvd.	Blk. Galvd.
¾ to 1½ inch and 11 to 12 inches.....	59.2	46.2
¾ to 10 inches.....	66.7	53.3

Boiler Tubes are very firmly held, no concessions being made on the recent schedule. Quotations are continued as follows.

	Steel.	Iron.
1 to 2½ inches, inclusive.....	50	40
2½ inches.....	50	42½
2¾ to 5 inches.....	60	50

Coke.—Quotations for 72-hour Coke are still \$4.50 to \$5, Chicago. Efforts are being made to secure reduced freight rates from the Coke regions to enable Coke to be laid down here at a lower price. The rates now prevailing are those which were made during the height of the boom.

Rails and Track Supplies.—Little information is available concerning the tonnage of Rail contracts now being placed by the railroad companies, but it is believed that a large volume of business is being entered. The demand for Light Rails continues very good. Heavy Sections are quoted at \$26 and Light Sections at \$25.50 to \$28, according to weight.

Old Material.—The market is feverish and decidedly a difficult one to quote. Not much business is being done, as far as can be learned, although an occasional good sale is being made and quite a demand is reported for Old Iron and Steel Rails. The largest Scrap sale coming to light was one of 5000 tons of Steel Scrap. The situation is such that a buyer anxious for some special grade of material will perhaps pay a higher price than our quotations, while a holder of Scrap which he desires to move may be obliged to take a considerably lower price. The following are approximate quotations per gross ton:

Old Iron Rails.....	\$16.00 to \$16.50
Old Steel Rails, mixed lengths.....	10.00 to 10.50
Old Steel Rails, long lengths.....	13.00 to 13.50
Relaying Rails.....	18.00 to 20.00
Old Car Wheels.....	15.00 to 15.50
Heavy Melting Steel Scrap.....	9.50 to 10.00
Mixed Steel.....	8.00 to 9.00
Iron Fish Plates.....	15.50 to 16.00
Steel or mixed do.....	9.50 to 10.00
Iron Car Axles.....	18.50 to 19.00
Steel Car Axles.....	15.00 to 15.50
No. 1 Railroad Wrought.....	14.50 to 15.00
No. 2 Railroad Wrought.....	12.50 to 13.00
Shafting, Iron and Soft Steel.....	17.00 to 17.50
No. 1 Dealers' Wrought.....	9.00 to 9.50
No. 1 Mill.....	7.50 to 8.00
No. 2 Mill.....	6.00 to 6.50
No. 1 Busheling.....	8.50 to 9.00
No. 2 Busheling.....	7.50 to 8.00
Iron Car Axle Turnings.....	9.00 to 9.50
Soft Steel Axle Turnings.....	8.00 to 8.50
Machine Shop Turnings.....	7.00 to 7.50
Wrought Drillings.....	6.00 to 6.50
Cast Borings.....	4.00 to 4.50
Mixed Borings and Turnings.....	4.50 to 5.00
No. 1 Boilers, cut.....	8.50 to 9.00
Boiler and Ship Scrap.....	8.00 to 8.50
No. 1 Cast.....	12.00 to 12.50
No. 2 Cast.....	8.50 to 9.00
Railroad Malleable Cast.....	12.00 to 12.50
Agricultural Malleable Cast.....	10.00 to 10.50

Metals.—No change has been made in the prices of metals. Lake Copper continues to be quoted at 17c. and Casting brands at 16¾c. Desilverized Pig Lead stands firmly at 4.32¼c. and Corroding 4.42¼c. in 50-ton lots.

Philadelphia.

Office of *The Iron Age*, Forrest Building, 1
PHILADELPHIA, PA., November 5, 1900.

The attention of the trade is concentrated on the election to such an extent that there is comparatively little that can be said in regard to the Iron and Steel trade. In every direction, however, higher rates are being quoted, and very large sales were made late last week at advancing prices. It is difficult to say what will be done after the election, as the recent heavy purchases may have discounted that event, but there is not the least doubt that prices will be maintained, even if no further advances are made. In some lines it is believed that manufacturers have a line of policy mapped out by which they will work in harmony, but they are not likely to make any announcement until the results of the election are definitely known.

Pig Iron.—Sales during the past week have been on a very large scale, and include all grades. Naturally there has been an inequality in prices, some at the low figures current during the past several weeks, but more at an advance of 25c. per ton, and some at 50c. advance. Prices to-day are extremely firm at the advance, and

some of the best informed houses are inclined to look for still higher figures before the market finds its level. Be that as it may, there is no iron to be had now, unless at sellers' terms, which, as we said before, are 25c. to 50c. over last week's quotations. To-day's prices are about as follows for city or nearby deliveries: No. 1 X Foundry, \$16.50 to \$17; No. 2 X Foundry, \$15.50 to \$16; No. 2 Plain, \$14.75 to \$15.25; Standard Gray Forge, \$13.75 to \$14.25; Ordinary Forge, \$13 to \$13.25; Basic, \$14 to \$14.25; Low Phosphorus, nominal, \$22 to \$22.50.

Finished Material.—There is a very strong undertone in this department, work being plenty and prospects for its continuing so being of the most encouraging character. The advance in prices mentioned a week ago is fully maintained, and it is expected that if the election turns out as expected something additional will be required, as all the indications point to better prices for Pig Iron, Billets and other primary materials. It is remarkable how business has picked up within the last couple of weeks, the full capacity of the mills being required to make deliveries as promptly as required, and in some cases orders are being turned down simply because deliveries could not be promised as quickly as were required. For the present quotations are about as follows for deliveries at nearby points: Ordinary Tank Plates, 1.38c. to 1.45c.; Universals, 1.40c. to 1.50c.; Shell, 1.50c. to 1.60c.; Flange, 1.65c. to 1.75c.; Charcoal Iron, C. H., No. 1, 2.25c.; Best Flange, 2.75c.; Fire Box, 3.25c.; Best Refined Bar Iron, 1.35c. to 1.40c.; Bar Steel, 1.30c. to 1.35c.; Angles, less than 3 inches, 1.35c. to 1.40c.; 3 inches and upward, 1.65c. to 1.75c.; Beams and Channels, 15 inches and upward, 1.65c. to 1.75c.

Old Material.—There is quite a sharp demand for some descriptions, and in such cases very full prices have to be paid. Bids and offers for deliveries in buyers' yards are about as follows: Choice Railroad Scrap, \$16 to \$16.50; No. 1 Yard Scrap, \$13 to \$14; No. 2 Light Scrap, \$10.75 to \$11.50; Machinery Cast, \$13.50 to \$14.50; Heavy Steel Scrap, \$14.50 to \$15; Old Iron Rails, \$16.50 to \$17; Old Steel Rails, \$15 to \$15.50; Wrought Turnings, \$8.50 to \$9; Cast Borings, \$7 to \$7.50; Old Car Wheels, \$16.50 to \$17; Iron Axles, \$18 to \$19; Steel Axles, \$17 to \$18.

St. Louis.

Office of *The Iron Age*, 1305 Chemical Building, St. Louis, November 5, 1906.

Pig Iron.—There was decided activity in the Pig Iron market during the past week. Sales footed up between 4000 and 5000 tons for local use, with probably 2000 tons additional from territory tributary to St. Louis. The purchasing seemed to have been fairly shared in by the various foundry interests, exclusive of car works. Requirements were covered for first four to six months of next year. Undoubtedly the values were favorable to buyers; it is considered that the prices were the lowest which will be reached this year, and lower than iron could be bought at to-day. Most of the orders were given by concerns who felt at the time that the result of the Presidential campaign was a foregone conclusion. There is still some hand to mouth buying in evidence, but not to the extent noted a month ago. Negotiations involving several thousand tons are now under way, with fair prospect of being closed up in the next 24 hours. Prices are a little uncertain; one of the largest producers quotes on a basis of \$10 for No. 2 at Birmingham, but there is safe ground for using the figures named below. The freight rate from Birmingham to St. Louis is \$3.25. We quote f.o.b. cars St. Louis:

Southern, No. 1 Foundry.....	\$13.75 to \$14.00
Southern, No. 2 Foundry.....	12.75 to 13.00
Southern, No. 3 Foundry.....	12.25 to 12.50
No. 1 Soft.....	13.75 to 14.00
No. 2 Soft.....	12.75 to 13.00
Gray Forge.....	11.75 to 12.00

Bars.—There is no decided change from the trade conditions which prevailed last week. The buying is of a steady, safe character. Some of the independent mills whose prices have been a trifle below that of the larger operators have made an advance to line up with the general market. Both Iron and Steel Bars are quoted by mills at 1.40c. to 1.45c., base, half extras, for heavy tonnage. Jobbers quote carloads from mill at 1.65c., full extras. Sales from store range from 1.75c. to 1.90c., full extras.

Rails and Track Supplies.—Mining and logging roads are sending in a steady run of orders for Rails of light section. Prices range from \$26 to \$29 per ton. Orders for Standard Rails from the big roads in this territory have not yet, it is said, been placed. Track Supplies are in good movement, with a slight reduction in quotable price of Spikes. We quote Splice Bars, 1.35c. to 1.75c.;

Bolts, with Square Nuts, 2c. to 2.10c.; with Hexagon Nuts, 2.10c. to 2.20c.; Spikes, 1.65c. to 1.75c.

Pig Lead.—There is a fair demand for Lead, but the week developed nothing more than spare purchasing for actual needs. Common Lead is quotable at 4.22½c. It is said that sales have been made at even a lower figure. Chemical is quoted at 4.25c. and Desilverized at 4.32½c. Lead Ore remained unchanged at \$46 per ton.

Spelter.—Inquiry was somewhat improved, but substantial results are still limited. There was a bid made at a shade over 4c. for a good tonnage, but conditions of delivery were prohibitory. The quotable price remains at 4c. to 4.02½c. The Prime Western Spelter Company are erecting two additional blocks of furnaces to their present smelter at Gas City, Kan. It is expected that the product of the new blocks will be available to the market by January 1. Some of the Western Spelter producers are about to establish a permanent joint selling agency at Pittsburgh. Zinc Ore maintained its top price of \$28.50 per ton.

(By Telegraph.)

There is profound satisfaction expressed in business circles on the election result. An active buying movement has already set in. This market is credited with additional sales of Pig Iron amounting approximately to 12,000 tons over and above the tonnage reported elsewhere in this report. The buying was done by both large and small concerns. This activity is a clear forerunner of what may be expected in the next few months.

Cleveland.

CLEVELAND, OHIO, November 5, 1906.

Iron Ore.—The sudden end of the coal strike in the anthracite district operated to make as sudden a change in the attitude of lake vessels toward the business for the remainder of the year. A week ago all vessel owners were pessimistic about the lake rates, considering it impossible to make money with their boats, therefore they intended to lay them up for the winter. The inevitable result was a strengthening of all lake freights and especially those on Iron Ore, for it became known that there were certain cargoes at the head of the lakes and a number of others remaining at Escanaba and Lake Michigan points which were to be transported during the month of November. The opening up of the hard Coal district, with the prospect of up cargoes which it brought, persuaded many of the owners to keep their boats in commission, and as a result the market is flooded with tonnage, but a very meager per cent. of the boats having gone to their docks. With a superabundance of tonnage and a comparatively limited supply of Ore to be brought down the lakes, the rate can be none other than weak. All indications are that everything will be late this year in connection with next season's Ore. The Ore producers have been expecting to fix their prices for next season, but after canvassing the situation carefully have come to the conclusion that it would be suicidal to fix prices now, hence the meeting of the Ore Association has been postponed until the middle of January. The demand for a lower price on Iron Ore is so strong now that the producers believe that they would be compelled to accept a much lower price than they are at present willing to take. Until Ore has been sold the vesselmen cannot fix their contract carrying rates, hence this matter will be settled late also.

Pig Iron.—The increased sales of Iron during the last two weeks has had a tendency to strengthen the market, although not sufficiently as yet to warrant the furnacemen in demanding any more money for their product. The first indication was in the advanced price in off Irons. Sales have been made this week at \$12, which is the same price as has been paid in the recent past for Bessemer. The sales of Foundry Irons remain heavy, but without change as to price except that a stronger feeling prevails. All transactions of this week have been on the basis of \$14 and \$13.50 for Nos. 1 and 2 respectively. While the buying is heavier than it has been, there is still a tendency to hold on to the larger volume of business that is yet to be done.

Finished Material.—A meeting of the Plate pool has been held this week to consider whether or not it is advisable to lower the price or hold firmly at 1.25c., which was established a week ago. The decision arrived at was that in view of the demand for the product and the small amount of material to be sold the price should hold. Sales have been comparatively light. The increased interest in Shapes manifest a week ago proved to be but temporary, the market still being backward. A large tonnage is in sight, however, that is expected to be unlocked in the next few days when the results of the election have been reflected in the trade. The association

price has held firm, no further attempt being made to break them which might be attributed to the small business. This week has seen an increased demand for axles, car work among the railroads becoming heavier. The Lake Shore has just placed a large order and has other work in sight for the mills, which condition is general with the railroads in this vicinity. The Bar product being so far below the demand for them has stiffened the prices. Deliveries are either very slow or altogether impossible, and the mill men are quoting 1.15c. at the mills, which equals 1.25c. in this city, and as far as heard the consumers have made no objections, paying the price on some small orders, with a good sized business to be done presently at the higher figure.

Old Iron.—There is a tendency on the part of dealers to ask better prices than they have been getting, although no advances have been noted this week. The demand among the mills seems to be heavier than formerly. The market is reflected in the following quotations: No. 1 Wrought, \$14, net ton; Old Iron Rails, \$17.50, gross ton; Car Wheels, \$17.50, gross ton; Cast Borings, \$5.50, net ton; Wrought Turnings, \$8; Machinery Cast, \$12.50, net tons; Stove Plate, \$9, net; Steel Rails, \$12 gross tons.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building,
Pittsburgh, November 7, 1900.

(By Telegraph.)

Pig Iron.—A meeting of the Valley furnaces is to be held in Cleveland on Thursday, November 8, and it is intimated that the price of Bessemer Iron for next year may be put at \$14, Valley. In the face of the heavy stocks piled at the furnaces, it is somewhat difficult to see how Iron could be sold at that price, which is equal to \$14.90, Pittsburgh. The Pig Iron market is firm, but there have been no large sales since our last report. Some Bessemer Iron, piled at one of the Valley furnaces, is being offered in good sized lots and at low prices. Forge Iron, which sold last week at \$12.50, Pittsburgh, seems to be higher, and \$12.75 is being quoted. No. 2 Foundry Iron has sold in good sized lots at \$13.75, while \$14 and up to \$14.50 is quoted by some furnaces. We quote Standard Bessemer Iron at \$13.25 to \$13.50; Gray Forge, \$12.75; No. 2 Foundry, \$13.75 to \$14.25, all f.o.b. Pittsburgh. We note a sale of 500 tons of standard Forge made last week at \$12.50, Pittsburgh, and also sales of probably 1500 tons at \$12, Valley furnace. This Iron does not come to this market. We also note a sale of 300 tons of standard No. 2 Foundry at \$13.75, delivered Pittsburgh.

Billets.—The Billet mills have apparently not given up their efforts to get the price of Billets up to about \$20, as another meeting is to be held in New York this week. We quote Bessemer Billets at \$17.50 to \$18, and reports are that sales have been made at less than our lower figure.

Sheet Bars.—We quote Sheet Bars, long lengths, at \$20, delivered Pittsburgh. Light Sheet and Tin Bars, cut to length, are quoted at \$22 to \$23, Pittsburgh.

Muck Bar.—We can note sales of probably 4000 tons of standard Muck Bars for extended delivery. We quote at \$24.50 to \$25, Pittsburgh.

(By Mail.)

Buyers are forcing the market up on themselves. In the past month the result of the election has been largely discounted, and there has been a heavy buying movement, filling most of the mills up with tonnage and putting prices up \$2 or \$3 a ton on some lines. The whole market now is active and strong, with probability of still higher prices after the election. It is not expected, however, that there will be any boom in prices, as buyers by discounting the result of the election have already advanced the market on themselves, as stated above. There have been some sales of Bessemer Pig Iron at about \$13.25, Pittsburgh; Forge Iron at \$12.75, and Foundry is also bringing better prices. Steel is quoted at about \$18, but on round tonnage and extended delivery this price would be shaded. On Finished Material the market is active and the new price on Plates is, we are advised, being firmly held. Iron Skelp is in active demand and the market is higher.

Ferromanganese.—We quote 80 per cent. Ferro at the combination price of \$75 a ton in lots of 50 tons or over.

For small lots \$85 is quoted. Some 75 per cent. Ferro is being put on the market by a Southern interest at lower prices.

Plates.—Another meeting of the Plate mills was held in New York last week, and some detail work left over from the first meeting was completed. The new price of 1.25c., Pittsburgh, on Sheared Plates, Tank quality, ¼-inch and heavier, is said to be firmly held. A good many buyers who had options on Plates at 1.15c. and even 1.20c. immediately exercised these, and in some cases tonnage was very much increased. There has only been a fair demand for Plates since the higher price was put into effect. However, there is a good deal of tonnage in sight, and the outlook is that the Plate mills will have plenty of work for the winter months. We quote: Tank, ¼ inch and heavier, 1.25c.; Shell, 1.30c.; Flange, 1.35c.; Marine, 1.45c.; all f.o.b. Pittsburgh. Fire Box Steel is 1.50c. for ordinary grades up to 2.75c. and 3c. for special grades.

Rails.—There is nothing of interest to report. The Rail mills are fully employed, with plenty of tonnage booked ahead. No large contracts have been placed in the past week. We quote Steam Rails, standard sections, at \$26 at mill.

Structural Material.—The leading Bridge interest have taken a large contract for Structural Steel for Germany. Some work for South Africa has been placed, and additional tonnage is pending. Part of the tonnage for the Lloyd pier at Hoboken went to a local mill. The bulk of the tonnage now being placed is for small lots, but it is claimed that some large jobs are held up pending the result of the election, and that if McKinley is re-elected a good deal of new work will immediately be given out. We quote: Beams and Channels, up to 15-inch, 1.50c.; over 15-inch, 1.60c.; Angles, 3 to 6 inches, inclusive, 1.40c.; over 6 inches, 1.50c.; under 3 inches, 1.25c.; Zees, 1.50c.; Tees, 1.55c.; Bars, 1.10c. to 1.15c.; Universal and Sheared Plates, 1.25c., all f.o.b. Pittsburgh.

Sheets.—In the past week there have been some large orders placed for Sheets for extended delivery, and buyers seem to have confidence that prices will not be lower, but on the contrary may advance. A good deal of tonnage is pending, and most of the small Sheet mills are sold up for several months. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.80c. to 2.85c.; No. 28, 2.90c. to 2.95c. Galvanized Sheets are 75 to 75 and 2½ per cent. off, 15c. freight, in carload lots.

Bars.—There is a good demand for both Iron and Steel Bars and prompt deliveries of the latter are, in many cases, hard to get. In fact, some of the leading mills rolling Steel Bars are so well filled up that they are naming prohibitory prices, not caring to take on any more tonnage, believing that the market will be higher. One leading local Bar mill is reported as holding Steel Bars firm at 1.20c. We quote Steel Bars at 1.15c. to 1.20c. at mill. It would take a very desirable specification to get a lower price than 1.15c., and it is doubtful if it could be done. Prices on Common Iron are firm, and we quote at 1.20c. to 1.25c. in carload lots at mill. High grade Iron Bars, made from all Muck Bar stock, are quoted at 1.45c. up to 1.60c.

Merchant Steel.—There is a better demand than for some time, and the market is firm with a decided upward tendency in prices. It is reported that some orders have been placed subject to cancellation in case of defeat of the present administration. Prices are firm, and we quote: Tire Steel, 1.25c. in carload lots, 1.30c. to 1.35c. in small lots; Toe Calk, 1.50c. in large lots and 1.60c. in small lots; Open Hearth Machinery, 2c. to 2.10c.; Plow Slabs, 1.65c. to 1.75c., base; Open Hearth Spring, 2c. to 2.10c.; Hammered Lay Steel, 3c.; Rolled Lay Steel, 2.50c.; Cold Rolled Shafting, 60 and 10 per cent. off in carloads; Tool Steel, 7c. and upward, according to quality. On Tool Steel freight is allowed east of the Mississippi River. Terms are 60 days, 2 per cent. off for cash in 10 days.

Skelp.—We note a very active demand for Iron Skelp, and prices on Grooved and Sheared are higher. We quote Grooved Iron Skelp at 1.55c. to 1.60c., which is an advance of about \$2 a ton over former prices. Steel Skelp, Grooved and Sheared, is about 1.35c., delivered, Pittsburgh. Some mills have recently quoted as high as 1.65c. on Grooved Iron Skelp. There is a very active demand. The mills are full of tonnage and prompt deliveries are hard to obtain.

Iron and Steel Scrap.—There has been a decided improvement in demand for Scrap, and prices are also better, dealers being able, we are advised, to make sales at prices ranging from \$1 to \$3 a ton higher than could have been obtained a month or two ago. It is believed that if the result of the election is favorable prices will

be still higher. We quote No. 1 Railroad Wrought Scrap at \$14 net ton; Old Iron Rails, \$18; Old Steel Rails, \$13 to \$14; Tank and Pipe Scrap, cut, \$10.50; Turnings, \$6 to \$6.50; Cast Iron Borings, \$5.50 to \$6; Soft Busheling Scrap, \$12; Low Phosphorus Melting Stock, \$14 to \$15, all in gross tons. Old Horseshoes are about \$12 net ton.

Tubular Goods.—October was one of the best months in the Pipe trade, in point of demand, for some time. A good deal of Pipe is going abroad, and some orders have been taken by the leading interest for South Africa. Prices to consumers in carload lots are as follows:

Merchant Pipe.		
	Black. Per cent.	Galvd. Per cent.
1/8 to 1/2 inch and 11 to 12 inches.....	61	48
3/4 to 10 inch.....	68 1/2	56
Casing, Random Lengths.		
	S. & S.	I. J.
2 to 3 inch.....	58	53 1/2
3 3/4 to 4 inch.....	63	59
4 1/2 to 12 1/2 inch.....	65	61 1/2
Casing, Cut Lengths.		
	S. & S.	I. J.
2 to 3 inch.....	53 1/2	49
3 3/4 to 4 inch.....	59	55
4 1/2 to 12 1/2 inch.....	61 1/2	57 1/2
Boiler Tubes.		
	Up to 22 feet. Per cent.	22 feet and over. Per cent.
Steel.		
1 inch to 1 1/2 inch and 2 1/2 inch.....	49 1/2	44 1/2
1 3/4 inch to 2 3/4 inch.....	45	39 1/2
2 3/4 to 13 inch.....	57	52 1/2
Iron.		
1 inch to 1 1/2 inch and 2 1/2 inch.....	49 1/2	44 1/2
1 3/4 inch to 2 3/4 inch.....	45	39 1/2
2 3/4 to 13 inch.....	57	52 1/2

Prices to jobbers are about 5 per cent. less than the above.

Connellsville Coke.—The Coke trade is somewhat quiet. Last week there were 14,746 ovens in the Connellsville region active and 6014 idle. The output was 152,027 tons, an increase over the previous week of nearly 5000 tons. We continue to quote strictly Connellsville Furnace Coke at \$2 and 72-hour Foundry at \$2.25 to \$2.50 a ton at oven. Some of the smaller Coke operators are offering Connellsville Coke, both Furnace and Foundry, at slightly lower prices. Main Line Coke is also being offered at much less prices than genuine Connellsville.

Birmingham.

BIRMINGHAM, ALA., November 5, 1900.

As indicated in last letter, the Iron market has improved very much. The inquiry has greatly increased and so have actual transactions. Both are widening in extent of territory and in the interests that are taking hold, and there has been very little difficulty in obtaining the market quotations. There were sales of Gray Forge at \$9 to \$9.50, No. 3 Foundry at \$9.50, and also rather heavy sales of Basic Iron at \$9.50. No. 2 Soft went at \$10, as well as No. 2 Foundry. There was one sale of Iron, 2000 tons, by analysis, at \$10.75. This is slightly above what would be the price of No. 1 Foundry. If there have been any sales at cut prices the secret has been well kept. There has been no necessity for it, as current quotations have been readily accepted by buyers. The leading interest here have been prominent in steadying the market, as they refused all concessions below current quotations and notified their selling agents that it was useless to forward bids below them. The week past recorded the largest sales for some time past. They equal fully a month's output with those so situated that they could sell freely. The buying has not been limited to special lines in the trade, but has leaped the barriers of separation and has been general. It is conservative to put down the week's sales at 80,000 to 85,000 tons. The most of it was for nearby deliveries, although a limited amount was placed for first quarter of 1901. The export trade was keener in buying than for some time back. The purchases favored No. 3 Foundry and Basic, though some No. 2 Soft was taken. The probability of an advance in price at the close of the week was great and your readers need not be surprised to find the market marked up 25c. per ton when this appears in print. Some ocean room was again offered for early in 1901 and promptly taken. Basic Iron is the leader of the herd in buying movements, and the way it has been taken the past week is regarded here as an indication of a healthy, continuous demand for some time to come. Some orders have been received contingent upon the election of McKinley. But they are not in sufficient number or magnitude to cut any ice in the market.

The idle furnace at Ironton is in full blast again, but the one at Gadsden is yet out. The furnace practice here, particularly of the larger interests, shows that in the line of progression they have reached better results than ever obtained in their previous history. The strike at the steel plant of the Tennessee Company has prac-

tically been defeated. The strikers forced them to cut down operations to only one furnace, whereas they now have four in commission, and are running with every indication in due time of full employment of their complete battery of ten furnaces. The Bar and Rod mills, with which the Tennessee Company have a contract for Steel Billets, Slabs, &c., had to obtain supplies elsewhere and succeeded in getting them in time to prevent any suspension of their business. Their orders have gradually increased until they now push the mill to supply them. In some of their departments they are running double shifts to keep in sight of the business offered.

The Dimmick Pipe Works report a splendid business, not only equaling their expectations, but exceeding them. Everything is going at full capacity and handsome orders have been lately booked.

In Coal a large business has been and is being done yet. The low water in the Ohio and Mississippi rivers has shut out several Pittsburgh operators who had contracts to deliver Coal to important interests in South Louisiana. They have been compelled to fill some of their contracts with Alabama Coal, and their purchases so far foot up considerably over 100,000 tons. In the meantime those sections of the country dependent heretofore upon the river tows for supplies are placing their orders for Alabama Coal and making for it a lively market.

In emigration inquiry and interest are both growing. Near Mobile, one option on 30,000 acres of land has been secured to be closed in the event of McKinley's election. The colony is composed mainly of Swedes from the Western and Northwestern States. There has been and there is now being made a strong effort to place colonies along the railway lines as nuclei for flourishing settlements of thrifty and progressive labor.

(By Telegraph.)

All interests here have advanced prices for Iron 50c. per ton and have withdrawn all previous quotations. The demand is fine and is increasing. A further advance is very probable, as sales are becoming larger; in fact, in some places No. 2 Foundry is now held for \$1 advance.

Cincinnati. (By Telegraph.)

Office of The Iron Age, Fifth and Main streets,
CINCINNATI, November 7, 1900.

The past week has been the most active one in the present year so far as the tonnage of Southern Pig Iron goes. The selling has covered all grades of Foundry Iron and also a very considerable quantity of Basic. The majority of buyers were inclined to urgency in the matter of delivery, though a fair tonnage was placed for the first quarter and even to last of the second quarter of 1901. Selling interests were far more ready to accept business on the basis of present quotations for prompt shipment than they were for next year deliveries. Some furnaces, while accepting orders for No. 2 Foundry on the basis of \$9.50, Birmingham, for quick shipment, were refusing later deliveries at less than \$10. The range of asking prices is almost as wide as it has been at any time lately, though the minimum figures moved up 25c. At the close of the week the bulk of selling is on the basis of \$9.50 to \$10, Birmingham, with the lower figure predominating in transactions. There is but very little doing in Forge Irons; 20,000 tons of Basic is reported sold at an advance of 50c. over the asking prices of a week ago. In tone the market is much improved and closes strong and active. Freight rate from Birmingham is \$2.75 to this point; from the Hanging Rock district, \$1. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	\$13.25 to \$14.00
Southern Coke, No. 2.....	12.25 to 13.00
Southern Coke, No. 3.....	11.75 to 12.25
Southern Coke, No. 4.....	11.25 to 11.75
Southern Coke, No. 1 Soft.....	13.25 to 14.00
Southern Coke, No. 2 Soft.....	12.25 to 13.00
Southern Coke, Gray Forge.....	11.25 to 11.75
Southern Coke, Mottled.....	11.25 to 11.75
Ohio Silvery, No. 1.....	16.50 to 17.00
Ohio Silvery, No. 2.....	15.50 to 16.00
Lake Superior Coke, No. 1.....	15.00 to 15.50
Lake Superior Coke, No. 2.....	14.00 to 14.50
Lake Superior Coke, No. 3.....	13.00 to 13.50

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades.....	\$20.75 to \$21.25
Standard Southern Car Wheel, No. 2.....	19.75 to 20.25
Lake Superior Car Wheel and Malleable.....	19.00 to 20.00

Plates and Bars.—There has been an increase in activity and a general strengthening in feeling. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.45c., with half extras; in small lots, 1.70c., with full extras; Bar Steel, in carload lots, 1.35c., with half extras; in small lots, 1.70c., with full extras. Iron Bar Angles, 1 1/2 x 3-16 inch and larger, in car lots, 1.70c.; in small lots, 2.20c.;

sheets, No. 10, 2.20c.; No. 27, Steel, 2.95c.; Plates, 1.65c. to 2c.

Old Material.—The situation continues very quiet and the basis of trading is unchanged. Dealers' buying prices per gross ton, f.o.b. Cincinnati, are about as follows: No. 1 Wrought Railroad Scrap, \$11 to \$12; Cast Railroad and Machine Scrap, \$10 to \$11; Iron Axles, \$14 to \$15; Iron Rails, \$12 to \$13; Car Wheels, \$14 to \$15.

The British Iron Market.

Summary.—The Iron and Steel trades have presented few new features during the past week. There has been no real improvement on the whole, and where a better tone has made its appearance it has generally proved to be ephemeral. Pig Iron is still dull, and although some better inquiries are reported, business is still confined within narrow limits. In the finished branches the demand lacks strength, and several reductions have taken place. The feature of the engineering trades this week has been the heavy weight of orders for locomotives placed in Glasgow and elsewhere. On the Continent business continues quiet.

Pig Iron.—Transactions in Pig Iron continue comparatively few and unimportant. Prices, which are usually a reliable index to the position of trade, are weak, and although in most cases they show no actual fall, they are maintained with difficulty in some quarters, and small reductions are reported from others. The position of Cleveland and Scotch warrants has been reversed, for the latter, which last week were quoted 1 shilling below Cleveland, are now $4\frac{1}{2}$ pence above. It is noteworthy that the Cleveland Hematite market, which was so stoutly maintained while ordinary Cleveland Iron was falling, is very weak, and while the latter is now only about 4 shillings below the best prices of this half year, Hematite has in some four or five weeks declined between 6 shillings and 7 shillings. The following is a statement of the public stocks of Pig Irons in tons:

	Tons.	Decrease during 1900.
Conna's at Glasgow.....	77,963	166,000
Conna's at Middlesbrough.....	14,075	52,400
Railway Stores, Middlesbrough.....	5,070	8,948
Conna's at Middlesbrough, hematite.....	555	160,388
Hematite, West Coast.....	36,670	

Manufactured Iron and Steel.—In the finished branches business has been slow, and several reductions in prices are reported. At Middlesbrough Steel Boiler Plates are down 5 shillings to £9 15s., Iron Ship and Girder Rivets 10 shillings to £11 5s., Iron Ship Plates to £7 12s. 6d., Iron Girder Plates to £7 17s. 6d., Iron Boiler Plates to £9 5s., and Steel Ship Plates to £7 10s. These reductions have been mainly brought about by keen German competition. There are reports of German Plates being bought for the Clyde and the Tyne. In Glasgow Steel Ship Plates are now reduced to £7 15s. to £7 17s. 6d. The basis of quotation for Lancashire Bars remains at £9 10s., and in South Staffordshire Marked Bars are still at £11 10s., with Common Iron at £9 15s. The general demand shows no improvement, but most of the works are fairly busy, the small orders being mostly for prompt delivery. In the Steel trade business appears to be good in Barrow and in South Staffordshire, but in Manchester the market has a weak, irregular tone, and there is not much doing.

Engineering and Shipbuilding.—In the engineering trade the general outlook is not altogether satisfactory. Locomotive builders report a large weight of orders on the market, more than sufficient to keep establishments fully going over the ensuing year, the only question being whether a considerable portion of the work to be given out may have to go elsewhere owing to English firms being unable to offer sufficiently early delivery to meet requirements. All branches of electrical engineering also continue exceptionally busy. Taking, however, the general engineering branches, such as Machine Tool making and Stationary Engine building, they are securing only a comparatively small weight of new work. Shipbuilders have not booked much work this week, but one or two small orders are reported.

Foreign.—In France the absence of buying is telling seriously upon the situation of the mill and forge owners, and it is becoming more and more doubtful whether makers will be able to secure enough work to keep their mills running regularly during the winter months. Mill and forge owners in Belgium have recently been entering into negotiations with blast furnace proprietors, in the hope of being able to come to some satisfactory arrangement with respect to future supplies of iron, but as the Pig Iron producers declare that they cannot offer any special terms the negotiations have fallen through. The depression in the German Iron trade is becoming more

accentuated every week, and prices of nearly all descriptions of material are moving downward.

Comparison of Prices.—The annexed table shows the current prices compared with those of last week, and of the corresponding period last year:

	Oct. 25, 1900.	Oct. 18, 1900.	Oct. 26, 1899.
	s. d.	s. d.	s. d.
Iron Ore—			
Rubio, Middlesbrough.....	20 6	21 3	18 6
Rubio, Cardiff.....	20 0	19 6	16 9
Pottery Mine, North Staffordshire.....	20 6	20 6	17 6
Hematite, West Coast (at mines)....	19 6	19 6	16 6
Pig Iron—			
No. 3 Foundry, Middlesbrough.....	65 9	67 9	69 9
Warrants.....	65 0	67 6	69 7
Scotch Warrants, Glasgow.....	66 4½	66 3	70 8
Hematite Warrants, West Coast.....	78 6	76 3	75 11
Cold Blast (Foundry), South Staffordshire.....	130 0	130 0	117 6
Welsh Hematite, Cardiff.....	80 0	80 0	82 6
Manufactured Iron and Steel—	£ s. d.	£ s. d.	£ s. d.
Marked Bars, South Staffordshire.....	11 10 0	11 10 0	10 0 0
Common Bars.....	9 15 0	9 15 0	9 0 0
Steel Rails, Middlesbrough.....	7 2 6	7 2 6	6 17 6
Steel Rails, West Coast.....	7 2 6	7 5 0	6 15 0
Steel Rails, Cardiff.....	7 0 0	7 0 0	6 12 6
Steel Angles (eng.), Middlesbrough.....	8 7 6	8 7 6	7 17 6
Steel Angles (eng.), Glasgow.....	8 0 0	8 0 0	7 10 0
Steel Plates (ship), Middlesbrough.....	7 10 0	8 0 0	7 17 6
Steel Plates (ship), Glasgow.....	7 15 6	8 0 0	8 0 0
Tin Plates, Bessemer IC Cokes, South Wales.....	s. d.	s. d.	s. d.
	24 0	24 0	15 6

—Iron and Coal Trades Review, October 26, 1900.

The German Iron Market.

ESSEN, October 24, 1900.—Since my last report confidence in the position of the German Iron market has suffered more. The demand is inadequate in nearly all branches, and the number of works which must lie idle for one or two days per week on account of lack of orders grows steadily. The greater number of manufacturers have orders on their books for many months to come, but specifications are not being received, so that there is a scarcity of work from day to day. As yet there is no indication of accumulations of Pig Iron, but the fact must be taken into account that there is no means of judging what are the stocks at the large mills which produce their own Pig Iron. It is certainly a fact that the demand for Pig Iron is exceedingly light and is not keeping pace with the production. Prices are as follows: Spiegeleisen, 10 to 12 manganese, f.o.b. Siegen, 110 marks; Special Mill Iron, f.o.b. Siegen, 90 marks; Bessemer Pig, 100 marks; Foundry Iron No. 1, 102 marks; Foundry Iron No. 3, 98 marks; Ordinary Mill Iron, 85 to 86 marks, all f.o.b. furnace; Basic Pig, 89 to 90 marks, delivered Steel works; No. 3 Luxemburg Foundry Iron, 82 marks, and Luxemburg Mill Iron, 80 marks, f.o.b. Luxemburg; English No. 3 Foundry, 90 marks, f.o.b. Ruhrort.

No changes have taken place in the Ore market, the supplies coming steadily and in considerable quantity. Since there have been no recent sales prices cannot be quoted. In the Steel market deliveries have fallen off considerably, and there is no question whatever of a lack of supply. Small quantities are being sold occasionally for immediate delivery, the prices being 125 marks for Ingots, 130 marks for Blooms, 135 marks for Billets, 139 to 140 marks for Slabs, per ton f.o.b. Rothe Erde, Diederhoffer, Ruhrort or Dortmund. These quotations apply to ordinary basic quality, Bessemer costing 10 marks, and Open Hearth 15 marks more per ton.

In Old Material the situation is growing very serious. The demand is very small and the offerings are urgent. Under these circumstances prices have dropped to a point close to that reached in the worst of times.

There is little demand for Bars, particularly for Iron Bars. The fact that the makers of Iron Bars succeeded some time since in carrying the price up to 220 marks, and holding it there, has led many consumers who had clung to Iron until then to begin to work up Steel Bars. To-day Iron Bars are readily obtainable at 180 marks, while Steel Bars are quoted 170 marks and for large blocks for early delivery they could be purchased at considerably lower prices, since the mills are eager for work.

The Hoop and Band mills have inadequate employment. While it is true that the association is trying to hold the price at 195 to 197.50 marks, it is a question whether they will be able for any length of time to maintain it in view of the scarcity of work. The conditions are similar in the Sheet and Plate market, particularly as to the former. At the present time negotiations are in progress at Berlin for the renewals of the Plate syndicate, which expires by limitation next summer, and for the formation of a Sheet syndicate. Telegrams received from Berlin indicate that the prospects of success are favorable. In Bars, as well as in Sheets, the market has been very much affected by the fact that dealers who bought heavily some time since are now endeavoring, by hook and by crook, to dodge their obligations.

Business in Beams is very quiet, owing to the fact that the building trades are doing very little. The official syndicate price of 140 marks, f.o.b. Burbach, is largely cut by dealers. Tube business is in a very unfavorable position, the works suffering from the competition in the world's markets since the home demand is inadequate to take care of the production, greatly increased through the building of new works. There is an active inquiry for Cast Iron Pipe of the smaller and medium sizes. The unfavorable situation continues in the Wire business, the syndicate price of 185 marks for Steel Wire Rods being thoroughly nominal. The car shops are actively employed and further orders are in sight. The machine shops are still doing a good deal of work, although new orders are coming in very slowly. The structural shops have been getting some contracts from South Africa.

Perhaps it may interest the readers of *The Iron Age* to note that a newspaper in this place announced that in the last few days 15,000,000 tons of Rails were placed in the United States. How enormously, then, your mills are employed!

New York.

Office of *The Iron Age*, 232-238 William street, }
New York, November 7, 1900. }

Pig Iron.—The buying movement continued during the past week and the market has strengthened. It is yet too early to judge to what extent the election has been discounted during the last three weeks, but it is believed that a good volume of prompt requirements are still to be covered. Sellers are holding for higher prices while that question is being tested. Quotations are as follows at tidewater: Lehigh, Schuylkill and Virginia Irons, No. 1, \$16.50 to \$18; No. 2 X, \$15.25 to \$16; No. 2 Plain, \$14.25 to \$15; Gray Forge, \$13.75 to \$15. Tennessee and Alabama brands, No. 1 Foundry, \$15.25 to \$15.50; No. 2 Foundry, \$14.25 to \$14.50; No. 1 Soft, \$15.25 to \$15.50, No. 2 Soft, \$14.25 to \$14.50; No. 3 Foundry, \$13.75 to \$14; No. 4 Foundry, \$13.25 to \$13.50; Gray Forge, \$13 to \$13.25.

Cast Iron Pipe.—The contracts involving about 30,000 tons for the Brooklyn and Bronx water lines have been placed, the greater part of the work going to outside shops. There is little new business of magnitude coming up. We quote \$23.25 to \$23.50 for 8-inch Pipe per gross ton.

Steel Rails.—Very little new business has been placed. It is understood that contracts for considerable quantities of Rails have been held back to await the result of the elections. We quote \$26 for Standard Sections, \$25 and \$26 for Light Sections, and \$38 to \$38.50 for Girder Rails. We quote Spikes, 1.45c. to 1.50c.; Splice Bars, 1.25c. to 1.35c.; Square Track Bolts, 2.05c. to 2.15c., and Hexagon Bolts, 2.20c. to 2.25c.

Finished Iron and Steel.—Some good contracts for buildings have been placed in this city, three of them calling in the aggregate for about 8000 tons. It is expected that further work will come out at an early date. We quote as follows at tidewater: Beams, Channels and Zees, 1.65c. to 1.70c.; Angles, 1.30c. to 1.40c.; Tees, 1.65c. to 1.75c.; Bulb Angles and Deck Beams, 1.90c. to 2c.; Universal Mill Plates, 1.25c. to 1.30c.; Sheared Steel Plates are 1.35c. to 1.40c. for Tank, 1.50c. to 1.60c. for Shell, 1.60c. to 1.75c. for Flange, 2.25c. to 2.30c. for Fire Box, 3.50c. to 4c. for Locomotive Fire Box, on dock. Charcoal Iron Plates are held at 2.25c. for C. H. No. 1, 2.75c. for Flange, and 3.25c. for Fire Box. Refined Bars are 1.30c. to 1.35c.; Common Bars, 1.15c. to 1.25c.; Soft Steel Bars, 1.15c. to 1.30c., and Hoops, 1.90c. to 2.25c., base, on dock.

F. M. Eaton, sales agent of the Virginia Iron, Coal & Coke Company, announces that Crocker Brothers of 99 John street, New York, and N. S. Bartlett & Co., 60 State street, Boston, Mass., have been appointed the sole and exclusive joint agents for the sale of the Pig Iron product of the company for the territory east of the Alleghany Mountains from Richmond, Va., to the lakes, and also Canada and the Provinces.

Metal Market.

Office of *The Iron Age*, 232-238 William street, }
New York, November 7, 1900. }

Pig Tin.—During the few days of the week under review preceding election day there was an extremely small amount of business transacted. To-day the market was quite unchanged and could easily be termed inactive. The nominal quotation to-day was 28c. for spot and

November. This is a shade firmer than the figure of a week ago. In London the market was pretty active yesterday and to-day. This was especially the case as regards futures. The closing London quotations to-day are £127 for spot and £124 for futures.

Copper.—While the market is still quiet and quotations remain unchanged, there is a tendency on the part of producers to hold out a little more firmly. As one producer put it, "When I get an order for a number of carloads for immediate shipment I send half of the amount ordered, and I am not engaging so far ahead as I did a week ago. The tone seems to be stronger, and while last week I might have sold Casting stock for 16.60c, I am now holding out for 16½c." The figure given for Lake Superior Ingot is still 16½c. Electrolytic and Casting are quoted 16½c. The London market was firmer, closing £72 10s. for spot and £73 2s. 6d. for three months' futures. Best Selected is 5 shillings better, coming to-day £78 15s. 5d.

Pig Lead.—Is without change. The demand has not gone above the recent low level, and the American Smelting & Refining Company still quote 4.37½c. New York and 4.32½c. St. Louis. The London market is unchanged at £17 12s. 6d.

Spelter.—Is unchanged as to actual quotations, but the trade are holding a shade firmer as to price. Advices from St. Louis do not mention a change in prices, but certain merchants in this city predict an advancing market, and are holding out for better propositions. The prices quoted on the New York Metal Exchange are 4.10c. to 4.15c., but many members of the trade are inclined to hold to the latter figure. After having declined to £18 11s. 3d. the London market reacted to £19, which was the closing price to-day.

Antimony.—Is unchanged, Hallett's being quoted 9½c. and Cookson's 10½c.

Nickel.—The supplies at hand having been practically exhausted, the great scarcity of this metal continues, and it is stated that it will continue for the balance of this year. Consumers who are in immediate need of small quantities are paying fancy prices. The nominal quotation is still 55c. to 60c. for small lots.

Quicksilver.—Is unchanged, prices here being \$51 per flask of 76½ lbs. in lots of 50 flasks and more. The London quotation is unchanged at £9 2s. 6d.

Tin Plate.—Business continues in a fairly active way at unchanged prices. The American Tin Plate Company are still quoting on a basis of \$4.19 per box of Standard 100-lb. Cokes, New York delivery, or \$4 f.o.b. mills.

A party of Pittsburgh business men have organized a company to be called the Iron City Sanitary Mfg. Company, and expect to place in operation by December 1 a plant at Zellenople, Butler County, about 35 miles from Pittsburgh, on the Pittsburgh & Western division of the Baltimore & Ohio Railroad. The company will manufacture and market a special line of bathtubs, plumbers' supplies and enameled ware of various kinds. The company have applied for a charter and expect to receive it on November 19. The new company have a capitalization of \$100,000, and have purchased a plant covering about 10 acres of ground near Zellenople. There are five large new brick and steel buildings in the concern and a number of others will be erected as soon as the charter is secured. The present buildings were erected some time ago for the Blackham Mfg. Company, a similar concern to that which has just been organized, but were never occupied, owing to the dissolution of the company before a charter could be secured. The buildings were bought for the Pittsburgh Company by William B. Scalfé & Sons. The buildings are now being equipped with modern machinery. The plant will be operated by electricity and a separate building will be erected in which an electric plant will be installed. It will be lighted throughout by arc lamps. The company already have large numbers of orders booked.

The engineer sent by the Government of Nicaragua to remove into the interior of the country the rails and other materials of the railroad constructed in 1889 by the Maritime Canal Company of Nicaragua, and chartered by the Government of the United States, running from San Juan del Norte (Greytown) 10 miles along the contemplated route for the inter-oceanic canal, has found the roadbed, cross ties, &c., in such excellent condition that he has recommended to the Nicaraguan Government not to interfere with the line, but to extend it for about 18 miles to Sarapiquí, on the Rio San Juan del Norte, whence there is a sufficient depth of water for steamboats to navigate all the year to Lake Nicaragua.

PERSONAL.

H. F. Frevert, formerly with the Garvin Machine Company, has associated himself with the Niles Tool Works Company, with headquarters at 136 Liberty street, New York.

On November 1 James A. Campbell retired as district manager of the mills of the Republic Iron & Steel Company in the Youngstown district, to become trustee of the Continental Iron Company, at Niles, Ohio. The former employees of Mr. Campbell presented him with a silver dinner service. On the same date Thomas Parrock, formerly district manager for American Steel Hoop Company, succeeded to the position made vacant by the resignation of Mr. Campbell.

Dr. W. B. Phillips of Pittsburgh, formerly editor of the *American Manufacturer*, has been appointed State geologist of Texas.

The will of Frank Williams, late of Johnstown, Pa., makes a bequest of \$300,000 to the Lehigh University, at South Bethlehem, for the benefit of worthy students. The will provides that the income be loaned to students at the university who are unable to pay their way through college. Their notes are to be taken for the amount borrowed, and the money, when returned, is to again be placed in the fund.

H. Holliday of the Consett Iron Works, Blackhill, Durham, who has been studying the situation in this country for some time, sailed for home yesterday.

Joseph E. Schwab, general superintendent of the Duquesne Steel Works and blast furnaces, has appointed Philip Davies superintendent of the new 40-inch blooming mill that is being built at the Duquesne Works.

President McKinley has been invited to attend the regular annual dinner of the Pittsburgh Chamber of Commerce, to be given in that city some time this month. The exact date has not been arranged, but it will be made to suit the convenience of the President, providing he will agree to attend.

Walter Hoffman, formerly chemist for the American Steel Casting Company, has gone to Chicago to accept a position with the Gates Company.

The Erie County Investment Company of Sandusky, Ohio, have brought suit to recover \$2000 from the Grant Machine Tool Works of Cleveland. The plaintiffs allege that some time ago the Grant Company approached them with a proposition for the removal of the Grant plant to Sandusky, and on the strength of this the Investment Company secured subscriptions for \$40,000 worth of stock and \$60,000 worth of bonds. Later the Grant Company announced that they had secured a more favorable proposition from Franklin, Pa., and the plant is to be located in that city. The plaintiffs claim commissions for their work in securing the sale of stocks and bonds, alleging that they were used simply as a lever to induce the Pennsylvania people to make a better proposition. The case will be watched with considerable interest by cities that are endeavoring to locate factories.

The Sandusky, Ohio, Water Works Department have opened bids on a 10,000,000-gallon pumping engine. The Henry R. Worthington Company, New York, made four proposals on different types of engines: 1, high pressure horizontal, delivered and erected on foundation to be provided by themselves, \$23,900; 2, low pressure horizontal engine, delivered and erected on foundations provided by themselves, \$19,300; 3, triple expansion condensing engine, delivered and erected on foundation provided by themselves, \$22,350; 4, triple expansion condensing engine, delivered and erected on a foundation provided by the city, \$20,165. Allowance on old pumps \$2000 each case. George F. Blake Mfg. Company, New York, Blake compound duplex inside plunger engine, delivered and erected, \$46,330. Camden Iron Works, Camden, N. J., one horizontal compound direct acting condensing pumping engine, delivered and erected on foundation provided by themselves, \$16,995.

Hawkrige Bros., Boston, Mass., for many years New England agents for Sanderson Bros. Steel Company, were appointed November 1 by the Crucible Steel Company of America agents for the sale of Park Steel Company's product in the same territory, in addition to the Sanderson agency, which they retain. Park Steel Company's store in Boston will be discontinued and the stock transferred to Hawkrige Bros., who will occupy larger quarters in a new location.

The Metropolitan Pipe Contracts.

Bids were received last Thursday by Commissioner Dalton of the Department of Water Supply, New York, for about 30,000 tons of cast iron water pipe, fittings and stand pipes. The bids were for furnishing, delivering and laying the work, which was divided into two sections. About 22,500 tons of the work will be required in laying a 48-inch double pipe line between the Milburn engine house, Brooklyn, and the Milburn efflux chamber, and for a single pipe line from that point to the Gate Chamber, at Spring Creek. This work involved 22,500 tons of 48-inch straight cast iron pipe, 35 tons of 36-inch, 6 tons of 30-inch, 25 tons of 24-inch, 4 tons of 20-inch, 7 tons of 18-inch and 10 tons of 12-inch. There are also 337 tons of special castings, 33 check valves and stop cocks, ranging from 48 to 12 inches, and two stand pipes, 80 feet high and 78 inches inside diameter. There are also included 15,000 pounds of cast iron, manholes, &c., 40,000 pounds of steel I beams and a quantity of wrought iron work. There were 65 items bid on, but the contract will be given to the lowest bidder in the aggregate. The aggregate bids were as follows:

Wm. H. Masterson, \$870,397.
John McNamee, \$918,021.
Nassau Construction Company, \$926,425.11.
Thilemann & Smith, \$950,106.
Daniel J. Green, \$965,553.50.
W. V. Crawford Company, \$979,926.75.

The second section of the work includes 7110 tons of straight 48-inch pipe, 80 tons of specials, 29 stop cocks, ranging from 48 to 6 inches, and 9 hydrants. The material will be used in laying mains in Moshulu Parkway, Bronx Park, Southern Boulevard and Potter place.

The bids were as follows:

Thilemann & Smith, \$253,853.50.
Wm. H. Masterson, \$263,925.50.
Michael Redmond, \$274,387.
Wm. F. Norton, \$281,029.
Wm. G. Leeson, \$291,544.
John Cornwell, Jr., \$292,055.
Henry Lipp, Jr., \$302,524.
Thomas Crummins, \$343,260.

OBITUARY.

FRANK P. WICK.

Frank P. Wick of Youngstown, Ohio, who has been in ill health for more than a year, died last week. Mr. Wick was born in Youngstown in 1847 and passed his entire life there. He was for many years engaged in the iron business, being superintendent for a long time of the mills of Mahoning Valley Iron Company until that property was taken over by the Republic Iron & Steel Company, after which he engaged in the coal business.

The Wm. B. Pollock Company, Youngstown, Ohio, builders of steel and iron plate construction for blast furnaces, steel works, &c., have been awarded the contract for all the iron work for a blast furnace in a foreign country. The name of the concern placing the contract is withheld for business reasons. The furnace will be an 80-foot stack, with an 18-foot bosh, four hot blast stoves 80 feet and 19½ feet in diameter. Work will be commenced on this important contract at an early date, and a considerable number of men from the Youngstown Works will be sent to the other side to do the work.

The city of Caracas, Venezuela, was visited on Monday by a severe earthquake, which inflicted great damage on the buildings of the city and caused the loss of a number of lives. The United States Legation was badly injured, but the occupants escaped unhurt.

A number of the colored graduates of the Tuskegee Normal and Industrial Institute of Tuskegee, Ala., have been engaged by the German Government to go to West Africa for the purpose of introducing the raising of cotton in the German colonies in that region.

The manager of the Syracuse Smelting Works of Syracuse, N. Y., L. Sapery, has returned from a two and one-half months' trip to Europe, and has made arrangements for representation in London and Birmingham, England, as well as in Scotland. He has also taken several large orders for babbitt metal to be shipped abroad and has also made large purchases of raw material.

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING NOVEMBER 7, 1900.

Cap'l Issued.		Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday.	Sales.
\$29,000,000	Am. Car & Foundry, Common.....	17½-17½	17½-17½	17½-17½	18 -18½	.....	19½-20	19,043
29,000,000	Am. Car & Foundry, Pref. (7 % Non-Cu.)	63½-64½	63½-64½	64½	64½-64½	.....	65 -66	5,435
19,000,000	Am. Steel Hoop, Common.....	22½-23½	22½-22½	22½-23½	23½-24½	.....	25½-27½	20,465
14,000,000	Am. Steel Hoop, Pref. (7 % Cu.).....	74½-74½	74½-74½	74½	74½-75	.....	75 -77	1,500
50,000,000	Am. S. & W., Common.....	34½-35	34½-35	35 -35½	35½-36½	.....	37½-40½	81,915
40,000,000	Am. S. & W., Pref. (7 % Cu.).....	75 -75½	75 -75½	75½-76½	75½-77	.....	77½-80½	11,865
28,000,000	Am. Tin Plate, Common, N. Y.....	32½-33	33 -33½	33	34½-34½	.....	36 -37½	8,239
18,325,000	Am. Tin Plate, Pref., N. Y. (7 % Cu.)..	82½-82½	82½-82½	82½	83½-83½	.....	85 -86	3,305
7,500,000	Bethlehem Iron.....	56½	56½	.....	56½-56½	.....	.....	30
15,000,000	Bethlehem Steel, Par \$50, \$1 paid in..	15½	.....	.....	16½-16½	.....	17½-18	600
7,974,550	Cambria Iron, Phila*.....	45	.....	.....	45	.....	.....	21
16,000,000	Cambria Steel**.....	15½	15½-15½	15½-16	16 -16½	.....	17½-17½	3,901
11,000,000	Col. Fuel & Iron.....	37½-38½	38 -38½	38½-39½	39½-40½	.....	42 -44½	14,900
46,484,300	Federal Steel, Common.....	37½-38	37½-38½	38½-39½	40 -41½	.....	43 -45	79,613
53,253,500	Federal Steel, Pref. (6 % Non-Cu.)....	67½-67½	67½-68	68½-69	69½-69½	.....	70½-72½	15,863
32,000,000	National Steel, Common, N. Y.....	28½-29	29 -29½	29½-29½	30 -31½	.....	32½-34	18,660
27,000,000	Nat'l Steel, Pref., N. Y. (7 % Cu.)....	87½-87½	87½-88½	88½-89	89 -90	.....	91½-92	2,465
40,000,000	National Tube, Common, N. Y.....	53½-53½	53½-53½	53½-54½	54½-56½	.....	58 -60	23,160
40,000,000	National Tube, Pref., N. Y. (7 % Cu.)..	98½-98½	98½-98½	98½-98½	98½-99	.....	100 -101½	6,081
5,000,000	Penna., Common, Philadelphia.....	54 -55	.....	.....	.....	.....	.....	619
1,500,000	Penna., Pref., Philadelphia.....	.....	.....	92	.....	.....	.....	20
12,500,000	Pressed Steel, Common.....	43	43 -44	44½-47	46½-48½	.....	50½-53	7,019
12,500,000	Pressed Steel, Pref. (7 % Non-Cu.)....	81½-82	82	83 -83½	83½-84	.....	85 -86	2,475
27,191,000	Republic Iron & Steel, Common.....	13 -13½	13½-13½	13½-14½	14½-15	.....	15½-16½	12,711
20,306,900	Repub. Iron & Steel, Pref. (7 % Cu.)..	56½-56½	56½	57 -59	57 -59	.....	59½-60½	5,883
7,500,000	Sloss-Sheffield S. & I., Common.....	.....	.....	.....	.....	.....	19 -19½	300
6,700,000	Sloss-Sheffield S. & I., Pref. (7 % Non-Cu.) .....	.....	.....	.....	65½-66	.....	67	200
20,000,000	Tennessee Coal & Iron.....	54½-55	54½-55½	55½-56½	56½-57½	.....	58 -62	29,597
1,500,000	Warwick Iron & Steel (par \$10).....	.....	7½	.....	8	.....	8½	250

* Par \$50. ** \$9 per share paid in. † 6% guaranteed by Beth. Steel Co. Late Philadelphia sales by telegraph. ‡ Ex-dividend.

Bonded Indebtedness: Am. S. & W., \$130,656; Am. Tin Plate, none; Am. Steel Hoop, none; Cambria Iron Co., \$2,000,000 6% debenture 20-year bonds, 1917, payable option 5 years, assumed by Cambria Steel Co.; Federal Steel Co., \$9,822,000 Illinois 5%, \$7,417,000 E. J. E. R. S. 5%, \$1,600,000 Johnson 6%, \$6,732,000 D. & I. R. R. S. 5%, \$1,000,000 2d D. & I. R. R. S. 6%, \$10,000 land grant D. & I. R. R. S. 5%; National Steel, \$2,561,000 6%; National Tube, none; Tennessee C. & I. R. R. Co., \$8,367,000 6%, \$1,114,000 7%, \$1,000,000 7% cu. pref.; Pennsylvania Steel, \$1,000,000 5%, Steelton, 1st, 1917, \$2,000,000 5%; Sparrow's Point, 1st, 1922, \$4,000,000, consolidated, both plants; Bethlehem Iron, \$1,351,000 5% maturing 1907. Interest and principal guaranteed by Bethlehem Steel Co. Republic Iron & Steel, none; Warwick Iron & Steel, none; Colorado Fuel & Iron Co.; Col. Fuel Co. Gen. Mort. 6% \$880,000, Col. Coal & Iron Con. Mort. 6% \$2,810,000, Col. Fuel & Iron Gen. Mort. 5% \$2,303,000. Also outstanding \$2,000,000 preferred stock with accumulated dividend of \$160,000 for year ending June 30, 1900. Sloss-Sheffield St. & I. Co., Sloss I. & S. first mortgage 6%, \$2,000,000, Sloss I. & S. general mortgage 4½% \$1,885,000.

Iron and Industrial Stocks.

During the whole week under review the stock market has been strong, and steel securities generally showed an advancing tendency. To-day, as the result of the election, there were very heavy transactions in nearly every stock, with substantial advances all along the line.

	Bid.	Asked.
American Bicycle Company, common.....	4	6
American Bicycle Company, preferred.....	21	24
American Bicycle Company, bonds.....	68	75
E. W. Bliss, common.....	.....	137½
E. W. Bliss, preferred.....	125	.....
Diamond State Steel.....	4½	4¾
Empire Iron & Steel, common.....	4	10
Empire Iron & Steel, preferred.....	42	48
International Silver, common.....	4	4¾
International Pump, common.....	24	24½
International Pump, preferred.....	71	72
National Enam. & St., common.....	19	24
National Enam. & St., preferred.....	76	81
New Haven.....	4	4¾
Otis Elevator, common.....	26½	27
Otis Elevator, preferred.....	87	88
Tidewater Steel.....	7½	8
U. S. Cast Iron Pipe Company, common.....	4	4½
U. S. Cast Iron Pipe Company, preferred.....	30	32
U. S. Projectile.....	100	.....
Va. C. I. & C., stock.....	5	8
Va. C. I. & C., bonds.....	32	37
H. R. Worthington, preferred.....	.....	110

Dividends.—The Shelby Steel Tube Company of Cleveland, Ohio, have declared a quarterly dividend of 1¼ per cent. on their preferred stock.

The American Radiator Company of Chicago have declared the regular quarterly dividend of 1¼ per cent. on their preferred stock, payable November 15. Books will be closed from November 10 to 15, both inclusive.

The Standard Oil Dividend.—Standard Oil directors have declared a dividend of \$10 per share, payable December 15, making \$48 per share so far this year and \$75 per share since the organization of the present New Jersey company in June, 1899. In the early part of that year 6 per cent. was paid on the old Standard Oil trust certificates, so that the Standard Oil dividends in the last two calendar years have aggregated 81 per cent. The first sale of the stock to-day was made at 650, an advance of 25 points over the highest price reached on Monday. When only 10 per cent. in dividends was announced stock was sold in successive lots at 645, at 639, at 630, at 625, at 620 and at 610. The dividend is payable on \$97,500,000 outstanding stock, although the authorized capital of the present company is \$100,000,000. The divi-

dend, therefore, calls for \$9,750,000. Including this payment, the Standard Oil Company have disbursed to their shareholders since June, 1899, in dividends \$73,125,000. This year's Standard Oil dividends will be much the highest ever paid by the company. The 48 per cent. already declared calls for \$46,800,000. Previously, the highest annual rate was 33 per cent., this amount having been declared both in 1899 and in 1897. In 1898 the payment was 30 per cent., and in 1896, when the heavy increases in the quarterly rate began, 31 per cent. was distributed. This makes the Standard Oil dividends in five years reach the total, unprecedented for any other extensive corporation, of 175 per cent. This means that within this period \$170,625,000 has been distributed in dividends to Standard Oil share or certificate holders.

One of the most notable speeches of the week was delivered by Sir Robert Giffen, the noted statistician and former president of the Statistical Society, before the Manchester Statistical Society, upon the European population of the world. He declared the growth of the United States compelled her recognition as the most powerful State in the world, so far as population and resources were concerned. He pointed out that the United States really had a greater European population than any European State, for Great Britain's strength might be considered to be diminished rather than increased by the possession of large territories, while the units of the Russian population were so inferior that the pre-eminence of the United States is not questioned. According to Sir Robert, there are now only four great world Powers, the United States, Great Britain, Russia and Germany, with France a doubtful fifth. He expressed the belief that the "yellow peril" would vanish, as the yellow races were quickly being outnumbered by the Europeans, which in another century should number nearly 2,000,000,000.

Consul Marshal Halstead writes from Birmingham, October 18, 1900, that he is in receipt of a communication from a steel manufacturing company, which contains an inquiry for American open hearth or Bessemer steel for making forks (hay, digging, coke, &c.), and requests the names of firms manufacturing high carbon steel of this sort.

The Pennsylvania Railroad Company have placed an order with the Pressed Steel Car Company for 2000 cars, to cost \$2,000,000. It is said that the Pennsylvania Railroad Company placed another order for 1000 cars, but the latter is not confirmed by the manufacturers.

The New York Machinery Market.

Office of *The Iron Age*, 232-238 William street,
New York, November 7, 1900.

With the announcement of the result of the election to-day comes the opportunity for a large number of consumers to "make good" numerous promises, and to break the bands which held back new enterprises and extensions to existing works. The number of projects which were held in abeyance, contingent on the outcome of the political contest, is well known to the trade. If half of them are put into motion and turned into the market there will be sufficient business to start a fair movement of activity. Of course, it cannot be expected that all of the papers held back will be signed this week and the market glutted with orders, but the time which has long been awaited with considerable anxiety has arrived, and it is now up to the men who waited.

Naturally, the week under review, the first week of this month, has been an extremely quiet one. In fact, every one was on the anxious seat, and transactions were of the smallest nature, involving only absolute necessities. Prices as a rule remained unchanged, but we hear a rumor of one large concern, who are said to have lowered their export prices. Another report has it that they have also lowered their domestic prices.

An illustration of what local sentiment is doing in the way of influencing purchasing for public work in England has just come to our notice. Specifications and plans are being drawn up by James Mansergh, 5 Victoria street, London, for a large pumping station, which is to be purchased by the municipality of Melbourne, Australia. A firm in this city wished to bid on the pumping engines, and wrote to Mr. Mansergh for a copy of the specifications and proposal blanks. In reply the following was received:

"Invitations have been sent out to several makers for the machinery required, and tenders are to be in shortly. There are certain inconveniences in having the work done out of England, and therefore I cannot accept a price from you for this work."

It is reported that plans are being prepared by the United States engineers, at Manila, P. I., for the improvement of the water supply of that city. Local engineers estimate that the cost of the improvements will reach \$1,000,000.

We are informed that all of the bids received on October 22 for furnishing two compound high duty pumping engines for the pumping station at Pittsburgh, Pa., have been rejected.

The John A. Meade Mfg. Company of 11 Broadway were awarded the contract for the coal and ashes handling machinery and coal crusher which are to be installed in the building of the Bureau of Engraving and Printing, Washington, D. C.

A short time ago we referred to the plans of Hoopes & Townsend of Philadelphia, which looked toward the building of a bar mill. We are now informed that the contract for the building has been let. The American Bridge Company have secured the order. The building will be 500 x 70 feet.

New car shops are being built at Middletown, N. Y., by the New York, Ontario & Western Railroad. The contract for the heating apparatus has been awarded to the American Blower Company of 141 Broadway and Detroit, Mich. The American Blower Company also received a contract for the heating of the new Philadelphia shops of the Chicago Pneumatic Tool Company.

We understand that operations are under way for the erection of a large paper mill at Franklin, Pa. The plant will be built by the General Manifold Company, who will manufacture a manifold paper requiring no carbon sheet. Geo. Miller of Franklin, Pa., is said to be interested in the company.

The American Blower Company have received from

the International Paper Company an order for a 1000 horse-power forced draft plant which is to be installed in the latter company's plant at Corinth, N. Y.

J. F. Ahrends, secretary of the De Laval Separating Company, Poughkeepsie, N. Y., is said to be interested in a new company who are to build a plant at Trenton, N. J., for the manufacture of turbine water wheels.

The Standard Pneumatic Tool Company, whose New York offices are in charge of G. A. Barden at 141 Broadway, have just received an order from the Navy Department for 20 pneumatic hammers and eight drills. They will be operated at the Brooklyn Navy Yard.

The Buffalo Forge Company of 39-41 Cortlandt street have received an order for a complete lumber drying outfit from Hammacher, Delius & Co. of this city. The apparatus is to be shipped to Hamburg, Germany.

Catalogues Wanted.—Prof. A. Mitinsky, director of the newly organized Mechanical Laboratory of the Mining Academy of Empress Catherine II, St. Petersburg, Russia, advises us that he desires to receive catalogues and other printed matter relating to the lines of its work.

A Hardware Float.

The float shown in the accompanying cut was used by Norwood & Field of Bellows Falls, Vt., in a Fourth of July parade. The float was 8 x 12 feet in size. The roof was used for advertising roofing, a different kind on each side. The sides of the float were divided into four



A Hardware Float.

sections, two on each side, each trimmed with different kinds of goods. The section nearest the front, on the side of the float shown in the illustration, contained a six-pointed star outlined with butts of various kinds and sizes. On the interior space were Knobs, Locks, Cupboard Catches, Drawer Pulls and other house trimmings. The other section on the same side represented a maltese cross, made up of Brushes, each of which was different in style and size. On the other side of the float one of the sections represented a wheel made up of Hammers, no two of which were alike. The other section was tastefully arranged with Hand and Cross Cut Saws. The back of the float was taken up with a large Bicycle poster, the whole affair being trimmed with yellow, red, white and blue bunting. The horses drawing the float were covered with blankets advertising the brand of Paints handled by the firm.

The float was designed and arranged by A. L. Field, and cost something over \$40, exclusive of the labor and the value of the articles used in carrying out the plan.

HARDWARE.

Dissolution of the Continental Company.

A significant event to which reference is made in another column is the decision of the Continental Company to wind up their affairs, leaving the factories which acted through them free to sell their products as formerly. This company were organized, it will be remembered, as the selling agency for several of the leading manufacturers of Window Screens, Door Screens and related goods. In this way the competition between themselves was regulated and the market in a good measure controlled, owing to the representative position occupied by the houses identified with the company. There were, however, a number of manufacturers in the open market, and while the operations of the Continental Company were characterized by moderation and no extreme advances in prices were attempted, the experiment was not attended with sufficient success to justify the continuance of the arrangement for another year. The manufacturers are apparently convinced that their interests will be best served by the independent marketing of their products. The agency system which was attempted is said not to have resulted in the economies which were anticipated, and the higher prices which were announced for their goods tended to build up competition which might result in a serious overproduction and demoralized prices. The disfavor with which combinations and pools are regarded by the trade was doubtless also something of an obstacle to the success of the plan, even though it did not properly come under either of these designations. The Continental Company, notwithstanding their short existence, are to be congratulated on the conservatism of their methods, the excellent feeling which has prevailed among their members, and the promptness with which a change of policy has been decided upon before serious harm has been done in the building up of new competition.

Classified Lists of Buyers.

The abandonment by the Wire Goods Association of the classification of Hardware houses according to their size and position in the trade is a significant reminder of the difficulties which attend such schemes. Thus to divide the trade into classes A, B and C, suggesting the great big bears, the middle sized bears and the little wee wee bears, may appear plausible and attractive when the matter is viewed theoretically. The difficulties of carrying it out are, however, in the long run usually insurmountable, and the complicated structure gradually develops weaknesses which interfere with its working, and, like the one-horse shay, it suddenly goes to pieces. There are combinations still using similar lists and the trade are naturally suspicious that something may happen before long.

The Meeting of the National Hardware Association.

The coming meeting of the National Hardware Association at Richmond is an event of recognized importance to the trade as a whole. This association is exceedingly influential, on account of the fact that it brings together most of the large jobbing houses in an organization which has for several years been working very successfully for the protection and promotion of jobbing interests. The indications are that the gathering will be largely attended. Besides the membership, which includes nearly 200 houses, many manufacturers will probably be present to avail themselves of the opportunity of meeting their customers and friends in the trade.

It is to be hoped that the association will be guided by prudent counsel, and that there may be due recognition of the rights and interests of both the manufacturers and the retailers.

Department Stores and Catalogue Houses.

One of the results of organization among the retail Hardware trade is an earnest consideration of means which can be adopted to prevent department stores and catalogue houses from invading the Hardware field. On another page will be found a reference to the matter as regarded from the point of view of the Interstate Retail Hardware Dealers' Association, who call attention to the necessity of concerted action by the merchants to meet or prevent this troublesome competition. The subject is of great practical importance to merchants, both wholesale and retail, as the question is one which bears on the interests of both classes of the trade. This is one of the questions which will receive consideration at the approaching meeting of the National Hardware Association. While it is probably true that in many cases goods are obtained by department stores and catalogue houses from the jobbers, the whole system is undoubtedly opposed to the interests of the jobbers, and they will have the sympathy of the trade at large in any efforts they may make to have goods marketed through the regular channels. In this connection the article relating to the position and work of the Interstate Association will be of interest. The view there expressed that "either the jobber or the retailer must go" if this kind of competition continues and extends, brings up in striking form some of the bearings of the question.

The Trade Outlook.

The Prospect for Business.

The Presidential canvass which has just closed is notable for the comparatively little interruption of business which resulted from the engrossment of the public mind in political matters. The course of trade continued without nearly as serious disturbance as is usually the case in Presidential years. Notwithstanding this fact there is reason to anticipate an enlargement of enterprise and an increased volume of business, in view of the removal of any element of uncertainty which may have existed, and the renewed attention which will be given to commercial affairs. Many enterprises have doubtless been held in abeyance, and a policy of caution has characterized the transactions of the past few months. That the prosperity which so generally prevailed will continue with a still larger volume of business may reasonably be expected.

Tone of the Hardware Market.

It is regarded as significant by many that in certain lines prices are firmer than a few weeks ago, and some actual advances have taken place. This is true in most part in goods which lie near the raw material, on which there has been a decided reaction from the high prices of last year. There is also a hopeful feeling in regard to the course of future business, and it is anticipated that there will be before long a fairly liberal placing of orders for spring delivery. While the trade are inclined to look with question upon some lines which advanced freely and have not yet receded, there are many goods which in the judgment of prudent buyers are a safe purchase. The prosperous condition of the country and the enlarging foreign business are features of the situation which tend to give steadiness to values and make the outlook for business promising.

Special Reports.

Chicago.

(By Telegraph.)

Hardware has continued in very active demand, although a falling off would not have been surprising in view of the nearness of election day and the increasing political excitement. Greater confidence is being shown in the future and contracts with manufacturers are being placed by jobbers on a rather extensive scale. The contracts are specially notable for staple goods, such as Wire Nails, Galvanized Sheets, &c. It is expected that the building trade will show much greater activity in the near future and that the demand for Hardware will therefore show a decided increase. Seldom have the Hardware interests taken a brighter view of the future. Prices have been quite steady for some time, and the opinion is strongly prevalent that any change to be made is more likely to be in the direction of higher than lower values. The demand for Heavy Hardware is fully as good as for Shelf Hardware, the manufacturing interests drawing their supplies from the jobbers being well employed. Collections are extremely good, indicating a high degree of prosperity throughout this territory. Manufacturers report October the biggest month of the year, even running ahead of some months of the great boom period. Jobbers are buying much more freely, some of them having placed very large contracts. Specifications for quick shipments are keeping the factories busy. It is expected that November will be still more active, as no indications are yet seen of anything calculated to cause a falling off in the demand.

St. Louis.

The rather astonishing business of October extends practically unabated into November. It is contended that the volume of business clearly indicates the limited stocks in dealers' hands. The quantity of orders is very large this week, and assembling quarters have been severely taxed for the quick handling of customers' wants. Extensive purchases have not yet been made of any particular item, the retail trade buying as a general thing to keep up with current sales. The large buyers seem to expect advances, especially on goods nearest raw material. The Heavy Hardware trade had an advance last week on Plates, and this week brings notice of higher prices from some independent Bar mills who have heretofore quoted under the market. Carriage Bolts are not shipped by makers with the promptness desired by jobbers and some embarrassment is resulting.

Notes on Prices.

Wire Nails.—There appears to be a somewhat larger demand upon the manufacturers for Wire Nails, and the indications are that stocks are light and business fairly active. Orders are usually for small lots and immediate shipment. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots.....	\$2.20
To jobbers in less than carload lots.....	2.25
To retailers in carload lots.....	2.30
To retailers in less than carload lots.....	2.40

New York.—The demand for small lots of Wire Nails from store continues in former volume. Local prices are well maintained. Quotations are as follows:

To retailers, carloads on dock.....	\$2.48
Small lots from store.....	2.55

Chicago, by Telegraph.—Jobbers are doing a heavy business in Wire Nails, which is coming from all parts of the territory covered. Prices are firm at \$2.35 for carload lots and the usual advance for small lots.

St. Louis.—What is spoken of as a "splendid run of orders," is reaching jobbers and producers this week. The capacity of mills is apparently taxed, as shipments are being made rather slowly. Price in carloads to retailers is \$2.40, base; smaller lots, \$2.45, base.

Pittsburgh.—An official of the American Steel & Wire

Company reports a very active demand for all their products, Wire Nails included. Buying is mostly in small lots, and for prompt shipment. Stocks of Wire Nails all over the country are very light. We quote, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots.....	\$2.20
To jobbers in less than carload lots.....	2.25
To retailers in carload lots.....	2.30
To retailers in less than carload lots.....	2.40

Cut Nails.—The movement of Cut Nails is of fair proportions, with a firm market. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, 2 per cent. off in 10 days:

Carload lots.....	\$1.95
To jobbers in less than carload lots.....	2.00
To retailers in less than carload lots.....	2.10

New York.—The local market shows no change in demand or prices. The requirements of customers call for prompt shipments. Prices are as follows:

To jobbers in carload lots on dock.....	\$2.13
To jobbers in less than carload lots on dock.....	2.18
To retailers in less than carload lots on dock.....	2.31
Small lots from store.....	2.25

Chicago, by Telegraph.—A remarkably good demand continues for Cut Nails, with prices maintained at \$2.25 for small lots from stock.

St. Louis.—The larger sizes of Cut Nails are in good movement and sales are in good proportion to Wire Nails. Jobbers' price out of stock is \$2.30 to \$2.40, base.

Pittsburgh.—Demand is mostly for small lots and prompt shipment. It is stated that prices are being firmly held. We quote, f.o.b. Pittsburgh, terms 60 days, 2 per cent. off in 10 days, as follows: Carload lots, \$1.95; jobbers, less than carload lots, \$2.

Barb Wire.—The domestic demand for Barb Wire is light, but shows some improvement. Export business is good. Quotations for home trade are as follows, f.o.b. Pittsburgh, net cash 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots, Painted.....	\$2.50
To jobbers in carload lots, Galvanized.....	2.80
To jobbers in less than carload lots, Painted.....	2.55
To jobbers in less than carload lots, Galvanized....	2.85
To retailers in carload lots, Painted.....	2.60
To retailers in carload lots, Galvanized.....	2.90
To retailers in less than carload lots, Painted.....	2.70
To retailers in less than carload lots, Galvanized...	3.00

Ellwood and Baker Wire is 5 cents and Washburn & Moen Glidden 10 cents per 100 higher than the foregoing prices.

Chicago, by Telegraph.—The demand for shipment from factory is running so heavy that stocks are rapidly being reduced. This is remarkable at this time of the year. Jobbers also report a very good demand and believe that it will run later into the fall than usual. Prices are firm at \$2.70 for Painted and \$3 for Galvanized Wire from stock, with the usual reduction on carload lots.

St. Louis.—The demand coming to this market is still in strong force. As weather conditions are extremely favorable, farmers have had no set back whatever either in fall sowing or property renewals. Painted in carloads to retailers is \$2.70, smaller lots, \$2.75. Galvanized commands an advance of 30 cents on these prices.

Pittsburgh.—There is very little doing in domestic trade in Barb Wire, but orders for foreign shipment are large. We quote as follows: Galvanized Barb Wire, \$2.80, in carload lots to jobbers, and Painted, \$2.50. Terms, 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh.

Plain Wire.—Orders for Plain Wire are generally for small lots, with a moderate demand. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

	Base sizes.	
	Plain.	Galv.
To jobbers in carload lots.....	\$2.15	\$2.55
To jobbers in less than carload lots.....	2.20	2.60
To retailers in carload lots.....	2.25	2.65
To retailers in less than carload lots.....	2.35	2.75

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the advances indicated in the following table:

Plain Fence Wire Advances (Catch Weights).			
Nos.	Base	Galvanized.	
6 to 9.....		\$0.40 extra.	
10.....	\$0.05 advance over base.....	.40 "	
11.....	.10 " " " ".....	.40 "	
12 and 12½.....	.15 " " " ".....	.40 "	
13.....	.25 " " " ".....	.40 "	
14.....	.35 " " " ".....	.40 "	
15.....	.45 " " " ".....	.75 "	
16.....	.55 " " " ".....	.75 "	
17.....	.70 " " " ".....	1.00 "	
18.....	.85 " " " ".....	1.00 "	

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—The volume of business keeps up to its recent proportions. Manufacturers and jobbers alike report a very satisfactory movement; small lots, Chicago delivery, are quoted at \$2.35, base.

Pittsburgh.—There is a good demand, but mostly for small lots. We quote:

	Plain.
To jobbers in carload lots.....	\$2.15
To jobbers in less than carload lots.....	2.20
To retailers in carload lots.....	2.25
To retailers in less than carload lots.....	2.35
Galvanized Wire up to No. 14 is 40 cents advance on Plain, Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, \$1 advance. Terms are 60 days net, with 2 per cent. discount allowed for cash if paid in 10 days from date of invoice.	

Window Screens, Door Screens, &c.—The Continental Company, Detroit, Mich., who were organized last year for the marketing of Window Screens, Door Screens, &c., have decided to wind up their affairs, and their factories will hereafter sell their products independently, as formerly. The manufacturers who operated through the Continental Company as their sales agents were the following:

Owosso Mfg. Company, Owosso, Mich.
Wabash Screen Door Company, Rhinelander, Wis.
The A. J. Phillips Company, Fenton, Mich.
The Porter Screen Door Mfg. Company, Burlington, Vt.
Owosso Mfg. Company, Perla, Ark.
Buchanan Screen Works, Hillsdale, Mich.
Cortland Door & Window Screen Co., Cortland, N. Y.

With these manufacturers the Continental Company made a contract for the sale of their products for one year, and in view of all the circumstances it has not been deemed advisable to make a renewal of the arrangement for the coming year. There were a number of manufacturers in the open market who disposed of their goods direct to the trade, and while the element of competition was diminished on account of the unifying of the interests of a number of the prominent manufacturers through this method of marketing their goods, there was sufficient competition for business to prevent the market from being under the control of the associated manufacturers. As the result of the organization of the company somewhat higher prices were developed, and the tendency in this direction was facilitated by the high prices which prevailed for Wire Cloth. As a result of having the market an entirely open one it is probable that the coming season will witness somewhat lower prices, and the prospect that Wire Cloth will be materially lower than last year will also tend to reduce somewhat the price of Screen Goods. The manufacturers, however, emphasize the point that no excessive advance was made in the prices of the goods, the manufacturers having only a fair margin of profit. The relations between the manufacturers are referred to as very pleasant, and unreasonably severe competition is not anticipated. The regular standard list of Door and Window Screens and the advances made for extras during the past season will be maintained during the coming season.

Wire Cloth.—The manufacturers of Wire Cloth held the anticipated conference in regard to prices for the coming season, but no definite agreement was reached in regard to prices. The market, therefore, is an open one. While the nominal price to the small trade may be regarded as \$1.25, careful buyers in fair quantities can

probably readily obtain \$1.10. The transactions have not yet been of sufficient volume to determine the market definitely, and it remains to be seen what its course will be. Some of the manufacturers have not as yet made public announcement of their policy or prices.

Poultry Netting.—At a meeting of the manufacturers of Poultry Netting action was taken in regard to prices for the coming season, and the market is in a fairly satisfactory condition. Current prices to buyers of fair quantities are represented by the discount of 80 and 20 per cent. The indications are that there will be a large volume of business, and the manufacturers are anticipating an early placing of stock orders.

Asbestos.—Asbestos products have been advanced 15 to 20 per cent., partly owing to an increased demand for the commodity in its many forms, and partially on account of a fire which crippled one of the principal sources of supply. Some of the mines which have been shut down for years because they were not on a paying basis have been reopened, and the shortage is not expected to continue much longer.

Lead Pipe.—A reduction of ¼ cent per pound in Lead Pipe is announced under date November 1.

Cordage.—The Rope market has stiffened as a result of advancing prices of fiber. Manufacturers generally quote Sisal Rope, on a basis of 7-16 inch and larger, at 6¼ cents, and Manila Rope, on the same basis, at 9¼ cents, as minimum prices. Manufacturers express themselves as expecting further advances. These may be but temporary, especially for Manila Rope.

Glass.—The American Window Glass Company report that all of their factories are now in operation, with a generally steady increase in force, and that the total amount of Glass cut and boxed is close to the average under most favorable conditions. It is reported that a good share of the independent factory's Glass has been and will be bought by members of the National Jobbers' Association. Discounts for small lots from the jobbers' list of September 1, which are uniform over the entire country, are as follows:

All single strength.....	.85 and 25 "
All double strength.....	.85 and 25 and 5 "
Prices on Plain and Figured Skylight Glass have been advanced by manufacturers from 25 to 30 per cent. Wire Glass was previously advanced in price about 15 per cent.	

Paints and Colors.—**Leads.**—The market for White Lead in Oil shows no change. Consumption is up to expectations for the season, taking into account the high price of Linseed Oil. Quotations are as follows: In lots of 500 pounds and over, 6½ cents; in lots of less than 500 pounds, 7 cents per pound. The advance in the price of standard grades of liquid paints recently announced is said to be from \$1.15 to \$1.25 per gallon, while the increase in the price of colors in Oil is referred to as equivalent to a 10 per cent. advance all around.

Oils.—**Linseed Oil.**—The future market for Linseed Oil remains unsettled, but is slightly stronger, owing to the advancing tendency of Flax Seed. Considerable speculative buying is being indulged in, deliveries extending to April and May, 1901, for carload lots. Recent orders of this character have been placed at 68 to 70 cents. No options, however, are given. Future Oil follows the fluctuations in the price of Seed, to a greater or less extent. Local demand is confined to small lots, at unchanged quotations, as follows: City Raw in lots five barrels or more, 75 cents; in lots of less than five barrels, 76 cents. State and Western brands are held at about 73 cents. Boiled Oil is 2 cents per gallon advance on Raw.

Spirits Turpentine.—The market for Turpentine has been quiet, with a tendency toward weakness. Inquiries are light, consumers of large lots holding off. Buying is confined to small lots. During the week under review prices have declined, quotations at present being 43 to 43½ cents for Southerns and 43½ to 44 cents for machine made barrels.

Inter-State Retail Hardware Dealers' Association.

THIS association, of which Fred. H. Cozzens is the efficient secretary, has issued an attractive pamphlet containing its constitution and by-laws, together with other matter explaining the scope of its operations, and referring especially to the reforms which it seeks to accomplish. The following extracts from it, some of which are attractively presented in a striking form on the cover, will be of interest, touching as they do upon questions in which Hardware merchants in all parts of the country are concerned:

Some Things to Think About.

THE catalogue house and department store is a new, serious and extremely oppressive competitor, which if unchecked threatens the *very life* of the retail hardware dealer. It is growing with the malignancy of a cancer. To-day many catalogue houses are offering some staple goods to your customers for *less* than you can buy of your jobber.

Alone and single handed you are absolutely helpless to combat this great competition. Even State organization alone can accomplish little, but a union of *several States* acting as one man is a power which no manufacturer or jobber can ignore. That is what the Inter-State Association is.

"Think on these things."

Some Phrases from Literature

which illustrate the possibilities of

The Inter-State Retail Hardware Dealers' Association.

"In union is strength."

"United we stand; Divided we fall."

"Organization is the keynote to success in modern commercialism."

"One soldier alone cannot fight much of a battle; a company is infinitely more serviceable; a regiment can overrun an ordinary city; a brigade a county, a division a State, and a corps or several of them a nation."

THE INTER-STATE HARDWARE DEALERS' ASSOCIATION can be made a brigade, a division or corps as the retailers of the land elect. Which will it be?

A single thread will sustain but a trifling weight; that's the **individual dealer**. A hundred or two threads, properly interwoven, will sustain a very heavy weight, but the breaking point is quickly reached when we begin to pile on the load. That's the **State Association**.

A dozen or fifteen of these strong

cords twisted into one mighty rope is capable of sustaining practically limitless weight. That's the **Inter-State Association**. Are you one of the threads? If not join your STATE ORGANIZATION at once, strengthening that cord just so much, and in turn strengthening the Inter-State.

"Think on these things."

BEAR IN MIND

TO-DAY

the retailer still markets from 75 to 90 per cent. of the leading hardware staples.

A DECADE AGO

he distributed from 90 to 95 per cent. of these same goods.

A DECADE HENCE

with present methods he will sell only from 60 to 75 of these same goods. Who will sell the balance? The Catalogue Houses and Department Stores. Where will the business come from aside from the natural growth? From the business of the *Retail Hardware Dealers*.

Are you satisfied to let this continue? If not join the Inter-State through your State Association.

Assist us in changing these conditions before it is too late, as it unquestionably will be before many years.

Appeal for Members.

An earnest appeal is made by the association to merchants who are not identified with State organizations, as follows:

If you are not a member of your own STATE ORGANIZATION send your name at once to YOUR State Secretary for an application blank, as you can only become a member of the Inter-State by joining your STATE ORGANIZATION.

The names and addresses of the secretaries of the States affiliated with the Inter-State are as follows:

MICHIGAN,
Fred. H. Cozzens, Detroit, Mich.
KANSAS,
J. A. Cole, Topeka, Kan.
NORTH DAKOTA,
C. N. Barnes, Grand Forks, N. D.
INDIANA,
M. L. Corey, Argos, Ind.
ILLINOIS,
Lewis M. Reeves, Peoria, Ill.
IOWA,
C. W. Brelsford, Villisca, Iowa.
MISSOURI,
E. Thomas, Trenton, Mo.

Catalogue House Competition.

It will thus be seen that the association is giving special attention to the troublesome subject of catalogue house competition. A recent issue of *Trade* gives some interesting figures as to the prices at which some leading goods are sold by catalogue houses, and shows the meager profits which the retailer would have in meeting this competition. The necessity for organized action on the part of the retailers is thus emphasized:

It requires no great stretch of the imagination to see that either the jobber or the retailer must go, and go much sooner than most people recognize, if the present condition of affairs is to continue. The catalogue house is a splendid example of up to date cash sale, quantity purchasing business and has simply cut out one of the profits between production and consumption.

It is here to stay, and the sooner jobbers and retailers realize this the easier it will be for them to adjust their business to meet this nineteenth century competition,

which, like a snowball, the bigger it grows the faster it grows. It is already evident that no retailer can do business on these margins even if he gets cash in advance with every sale. What then is the secret of the catalogue concerns' ability to undersell even the jobber in some instances? Is it some new panacea for mercantile ills which these shrewd concerns have discovered, and which they monopolize? Assuredly not, but is simply the result of keen, discriminating, quantity buying for cash, which gives the buyer, if he is "on to his job," the short price every time, and the cutting out of one profit in the distribution of merchandise.

The remedy for this condition is, in our judgment, extremely simple. There are in the United States probably 22,000 retail dealers in Hardware. Let us suppose that each of these dealers handles, roughly speaking, in the vicinity of \$40 worth of these principal staples each year. This, of course, is far from correct, for the quantity varies greatly in different localities, and the total shown by these figures would considerably exceed the total output of some factories, but for illustration and in the absence of more definite statistics it must suffice. The retail Hardware trade in the United States is probably still marketing from 75 to 90 per cent. of the principal Hardware staples, while the catalogue house disposes of from 10 to 25 per cent.

Twenty-five years ago the figures were probably, dealer 90 to 98 per cent., mail order houses 2 to 10 per cent. Another decade hence the figures will surely be much nearer half and half than those existing to-day. Every dollar of this money in catalogue house business is at the expense of the retailer.

The remedy, based upon the above estimates of the relative value of the retail trade as compared to that of the catalogue house and department store, which, while purely imaginative, is sufficiently correct to show that the power to remedy this great and growing menace to the business of the retailer, still rests with him. That power, which he cannot exercise individually, but which must be exerted through the medium of association with his fellow merchants, is the ability to say to the manufacturer: "You cannot and must not sell the catalogue houses and department stores which are steadily undermining my business, and at the same time sell me!" Nearly every State has its State organization of Hardware dealers, of grocers and of those in other lines. The grocers and Hardwaremen possess national organizations. If one-fourth of the dealers in these lines in the various States were members of a State association of their own tradesmen, and if these State associations were merged and welded into a compact whole by affiliation, the remedy could be applied at once; and indeed the day when this can be done effectively is rapidly approaching, for the need of efficient organization is growing apace, and slowly but surely the strength of the Inter-State Retail Hardware Dealers' Association, the National Association of Retail Grocers and the National Association of Retail Druggists is developing.

Already some of these organizations have taken decisive action and gained important concessions from manufacturers.

Others have in contemplation equally important action which will culminate in the near future. If these efforts are to succeed they must have the united and unanimous support of the retail merchants in the lines affected.

If these efforts fail, either the jobber or the retailer must go. Which will it be?

New England Hardware Dealers' Association.

The regular monthly meeting of the New England Hardware Dealers' Association will be held at the United States Hotel, Boston, on the evening of the 14th inst. The speaker of the evening will be Robert Luce of Somerville, Mass., who will take for his topic "Taxation Problems." The subject of newspaper advertising will also come up for attention and the methods pursued by the members will be discussed. During the evening Robert L. Van Buskirk, accompanied by Miss Madge Parks, will favor the company with some choice vocal selections. The Entertainment Committee having charge of the meeting consists of Calvin M. Nichols, Dorchester, Mass.; William E. Whitney, Somerville, and Chas. H. Stevens, Arlington.

King & Eddy, Hardware merchants, Moscow, N. Y., whose store was destroyed by fire in June last, expect to occupy their new building, now in course of erection, on December 1.

Export Business.

FROM A LONDON CORRESPONDENT.

Trade Bias.

AN interesting circular letter has been sent out by a mining engineer, a metallurgist, who is bitterly incensed at the influence which Americans possess in all the mining centers of South Africa. It is a suggestive document as indicating the growing influence of the American metal worker, whether in heavy or light goods, in South Africa. I quote a few sentences and American exporters will draw their own deductions:

Allow me to call the attention of English merchants and manufacturers to the great demand there will be for merchandise of nearly every kind in South Africa after this war is finished, and to suggest their sending out good pushing representatives to endeavor to obtain a good proportion of this trade for England. At the present moment German firms do a large and lucrative business as importers of general merchandise at the ports, while Americans have a very strong hold on the machinery, Hardware, and, in fact, all mining requisites in the mining districts. Their influence on these particular branches of trade through so many of them occupying the positions of managers and engineers of large English gold mines on the Rand before this Boer war commenced was enormous, and, as they are very clanish, it is extremely difficult for English manufacturers of this class of goods to obtain even a footing. I will explain how these Americans work together: When an American firm sell machinery to a mining company they recommend Americans to erect it, and these are often appointed to run it. These American nominees, thus placed in responsible positions, from clanishness, also employ Americans under them, and, of course, take particular care that all orders for machinery, &c., are sent to the American firm by whom they were recommended, and thus English firms suffer and Americans (with their not overpowering sense of modesty) are kept unduly to the fore. The American element through such means was so strong in the Transvaal before the war commenced that it is the duty of every Englishman to do everything in his power to prevent it again attaining such excessive preponderance.

While this may not be particularly pleasing to English readers, I suppose American manufacturers and exporters will not be sorry to hear that they are doing so well. There can be no doubt that American goods are in increasing demand in South Africa, and that there is an excellent opening for many lines of Hardware as well as the heavier products.

How Not To Do It.

In my last letter I referred to the case of an American firm who have been spreading broadcast a letter offering to supply electrical apparatus at exceptional prices. I pointed out the futility of this method of business, remarking that English importers do not feel inclined to handle American goods unless they are pretty certain that the man round the corner is not having his "cut in" on precisely the same article. A well-known house recently received samples and what appeared to be special terms from an American manufacturer. The head of the house remarked:

I should like to have handled these goods, but I find that all our competitors have them too. And our competitors know that we have them. The result is that no trade will be done, although the goods are salable.

This is another example of the same kind of feckless trading that not only does so much harm to the manufacturers themselves, but to American trade in general. Merchants and agents over here who handle American goods lose patience with this happy-go-easy sort of thing, and the result is that when a good man comes along who knows his business he has to start in and break down a certain amount of prejudice which ought not to exist.

They Won't Pay.

The agent in question said that the number of Americans who are bombarding him with applications to take up their goods is larger than one would imagine; but he added:

These Americans want us to do a lot of things for them for nothing. They will do nearly everything for us except pay. It is not that they have not got the

money, because they have, but they simply do not trust us. Now what earthly use is there in their trying to do business with us at all unless they can trust us, and if we have their confidence why should they be afraid to consider terms for pushing their business? Here is an article which sells fairly well among ironmongers, but the American maker in question is constantly growling at us because we do not sell more. We felt under some obligations to this manufacturer, having promised that we would push the article for all we were worth. Accordingly a few weeks ago we put a special traveler on; sent him round the coast at a cost of not less than \$60 a week. The sale of the article did not pay the traveler's expenses by a long chalk. The American manufacturer gets his orders, such as they are, while we are heavy losers. We won't do that sort of thing again. If we are worth while negotiating with, and the article is new on the market, the American maker must pay something toward the cost of the selling. We are not merchants, we are agents.

Requests for Catalogues, &c.

W. R. LANG & CO. have purchased the business of S. L. Mayers, Hillsboro, Texas, dealers in Shelf and Heavy Hardware, Tinware, Harness, &c. The new proprietors advise us that they would be pleased if manufacturers and jobbers would send them catalogues and price-lists relating to the above lines.

Sledge & Barkley of Lawrenceville, Va., dealers in Hardware, Vehicles, Harness, &c., have recently completed a basement under their brick block which gives them additional floor space of about 2500 square feet. In this they will carry Cut and Wire Nails, Tarred and Metal Roofings, Barbed Wire and other Heavy Hardware. They advise us that they will buy in carload quantities, and would be glad to have manufacturers furnish quotations.

Hudson Bros. & Co., dealers in Carriages, Wagons, Bicycles, Stoves, Agricultural Machinery, &c., Ellisburg, N. Y., are about to start a Hardware and Tinware store in connection with their other business, and will value catalogues, quotations, &c., from the trade.

Hardware Club of New York.

THE announcement is made by the House Committee of the Hardware Club that the repairs to the building in consequence of the recent fire have been somewhat delayed, but temporary repairs to the kitchen and serving room have been made and the club was reopened on Wednesday, November 7. The restaurant, while not in complete order, will be open from 8 a.m. to 4 p.m.

Morley Bros.' New Catalogue.

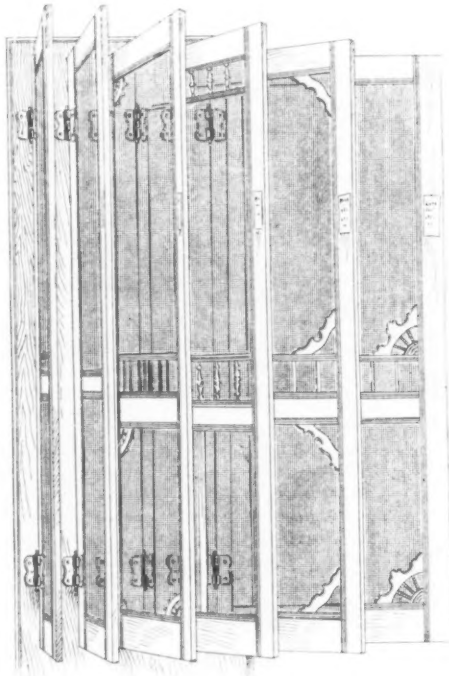
MORLEY BROS., Saginaw, Mich., have just issued a large edition of a General Hardware catalogue containing 1274 pages, each $12\frac{1}{2} \times 9\frac{1}{2}$ inches, leather bound in stiff covers. The frontispiece gives illustrations of their main establishment, their factory, their repository and their Iron, Steel and Heavy Hardware warehouse. It is divided into a number of departments, including Hardware, Tinware, House Furnishing Goods, Saddlery Hardware, Cutlery, Silver Ware, Bicycles and Sundries, Guns and Ammunition, Fishing Tackle and Sporting Goods. This concern are also manufacturers of the Blue Line Lumbering Tools, easy rolling Shelf Ladders, Harness, Horse Collars and strap work, all of which are illustrated and described in the catalogue. It is especially requested in order to facilitate a prompt and careful filling of mail orders, which are particularly solicited, that buyers will use the figures and numbers given in the catalogue so that wants may be clearly understood and prompt and accurate shipment made. The catalogue is well printed, conveniently arranged and satisfactorily represents the large and varied line of goods marketed by this house.

Wm. W. Fleming has recently purchased the Hardware and general merchandise business of Harvey Walling, Alden, Ill. Mr. Fleming's terms are strictly cash, and he intends adding a line of Agricultural Implements in the spring.

Hardware Store Arrangement.

SAMPLING SCREEN DOORS.

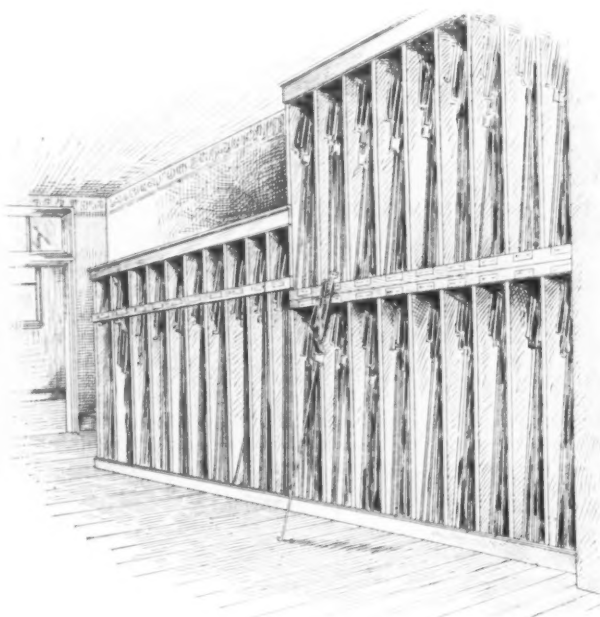
Sampling Screen Doors is a problem which comparatively few Hardware merchants have solved satisfactorily. The accompanying cut shows the method used by Weed & Co. of Buffalo, N. Y., in their retail store. The sample doors are hinged to an upright panel, side



by side, about 6 inches apart. This allows swinging them out of the way in an instant, and takes up but little space. On each door is tacked a card, stating the price and different dimensions of the Doors in stock. The retail stock is kept in the basement in upright bins.

TRANSOM LIFTERS.

The plan of keeping Transom Lifters in stock followed by Weed & Co. of Buffalo, N. Y., is shown in the accompanying cut. The bins are located on the second

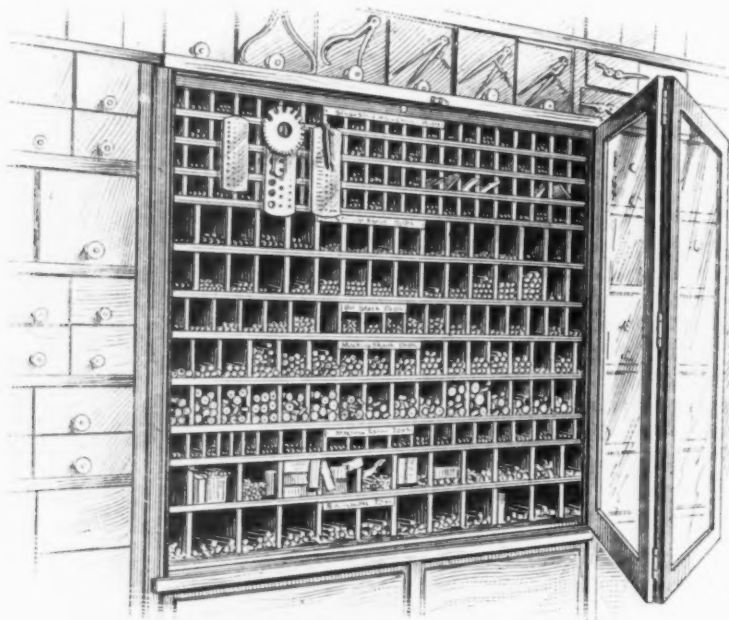


floor, one for each size and length. As soon as Transom Lifters are received each arm is tied to its Lifter and the goods placed in their respective bins. A sample of each

Lifter is carried in the retail department, in addition to which a top lift and a bottom lift are fastened to two windows, to show customers how they are operated.

Drill and Tap Case.

A CASE for holding Drills and Taps, in use in the store of Wood & Menagh, Jersey City, N. J., is shown in the accompanying illustration. It measures 32 inches high by 37 inches long and is divided into a large number of compartments to hold the many varieties and sizes of Taps and Drills carried in stock. These are



Case for Holding Drills and Taps

divided on the shelves as follows: Stubs' Steel Wire Gauge Drills, four shelves; Straight Shank Drills, two shelves; Bit Stock Drills, one shelf; Machine Shank Drills, two shelves; Machine Screw Taps, one shelf; Hand Taps, one shelf, and Blacksmiths' Taps, one shelf.

A novel feature of this case is the way in which the two doors are hung. By reference to the illustration, it will be seen that one door is hinged on the other, so that they can be easily folded back out of the way. These doors are generally kept closed so as to protect the contents.

A number of gauges are hung within the case, so as to be of easy access when required.

S. F. Myers Company's Catalogue.

S. F. MYERS COMPANY, 48 and 50 Maiden lane, New York, have just issued "The New York Jeweler" for 1901, as their annual catalogue is known. It is a book of over 500 pages, size 9 x 12 inches, with linen lined covers, and the firm believe it to be the most complete book they have ever issued. In comparing it with last year's issue, we find they have altered the form somewhat, and, utilizing a high grade paper, have inserted a large number of fine half-tone plates, particularly in their silverware, cut glass, fine umbrellas, leather goods and gold and diamond jewelry departments. The prices in the catalogue, being list and subject to a uniform discount, makes it particularly desirable.

THE Special Notice on another page signed "Teu-tonic" will be of interest to manufacturers of Iron and Steel, Tools, Machines, &c., referring as it does to a German house who offer their services as sole agents for Germany and Northern Europe. It will be noted that a representative of the house is now in New York City, who is prepared to confer with any who may be contemplating such an arrangement.

Slip for Use in Tin Shop.

THE accompanying cut shows a Time and Stock Slip originated and used by C. J. Rumsey & Co. of Ithaca, N. Y. These Slips are intended to remind the tinsmith of the items used on jobs. He is supposed to look the slip over carefully when making a charge for work, so as to omit nothing. The system, however, has not proved infallible. The firm believe the correct way to keep track of time and stock in a tin shop is to put a careful clerk at a desk in the shop and have an account kept of how each workman spends each hour of the day. This

clerk could also keep the time of each separate job, which would be of assistance to the foreman in estimating the cost of different goods. It is the opinion of the

Time and Stock Slip.

Tin Eave Trough, 24 inch, 1 c. - 1 x.	Standing Gutter
" " " 24 " " 1 c. - 1 x.	Valley Tin, 5 inch, 1 c. - 1 x.
" " " 24 " " 1 c. - 1 x.	" " 7 " " 1 c. - 1 x.
Galvanized Eave Trough, 24 inch,	" " 10 " " 1 c. - 1 x.
" " " 24 " " 1 c. - 1 x.	" " 12 " " 1 c. - 1 x.
" " " 24 " " 1 c. - 1 x.	" " 20 " " 1 c. - 1 x.
" " " 24 " " 1 c. - 1 x.	" " 25 " " 1 c. - 1 x.
Mitre Joints.	Add for Painting
Hangers, Berger, 24 inch,	Tin Sheets, 14 x 20, 1 c. - 1 x.
" " 24 " "	" " 20 x 25, 1 c. - 1 x.
" " 24 " "	" " 25 x 30, 1 c. - 1 x.
" " C. J. R. & Co., all prices.	Flashings, 5 x 7.
Wire.	Sq. ft. Tin Roofing
Tin Conductor, 2 inch, 1 c. - 1 x.	" Steel
" " 3 " " 1 c. - 1 x.	Roofing Cement.
" " 4 " " 1 c. - 1 x.	Edge Roll
Galvanized Conductor, Cor., 2 inch,	Flashing Hooks.
" " " 2 " "	Roofing Nails.
" " " 4 " "	Screws.
" " " 5 " "	Pump.
Tin Elbows, 2 inch, 1 c. - 1 x.	" Leathers.
" " 3 " " 1 c. - 1 x.	Lbs. Lead Pipe.
" " 4 " " 1 c. - 1 x.	Chimney Brick.
Galvanized Elbows, Cor., 2 inch,	Lbs. Zinc.
" " " 2 " "	Lbs. Galvanized Iron.
" " " 4 " "	Painting.
" " " 5 " "	Bu. Charcoal.
Conductor Strainers, 2 inch,	Lbs. Solder.
" " " 2 " "	Acid.
" " " 4 " "	3 Hours Work Rep. sent & life
Conductor Fasteners for Wood or Brick.	" " Help.
" " Austin for Wood or Brick.	Cartage.
Who for 112 Sears St. (Sign Here)	
Date June 9 1900 C. J. Rumsey	Workman.
Please fill out and hand in at once upon completion of the job.	
C. J. RUMSEY & CO.	

Slip for Use in Tin Shop.

firm that in a large shop such a clerk would pay, but in a shop with only a few workmen it might prove too expensive.

Price-Lists, Circulars, &c.

UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn., and 313-315 Broadway, New York, have just issued two interesting booklets. One is entitled "Game Laws of the United States and Canada," being a compilation of the gunning laws, with special reference to seasons and other provisions and restrictions in force in the various States and Territories of the United States and the provinces of Canada, including also 1900 legislation. The other is a record of their ammunition in shooting contests in the United States, with rules governing the different departments of shooting, giving targets and records of value to those who use ammunition. Both of these books, one of which is copyrighted, will be sent to interested persons on application.

SARGENT & Co., 149-153 Leonard street, New York: Illustrated booklet describing the Eclipse Check and Spring for noiselessly closing doors of all kinds.

CHAS. E. MILLER, 97 to 101 Reade street, New York: Catalogue No. 2, giving illustrations and list prices of Automobile Parts, Fittings, Sundries, Tools, &c.

ROCHESTER WRINGER COMPANY, Rochester, N. Y.: Catalogue showing Rochester, Reversible and "B. L. W." Wringers, Wash Bench, Ironing Table, Adjustable Clothes Rack and Self Wringer Mop.

THE TOLEDO SAW COMPANY, Toledo, Ohio: Catalogue relating to "Toledo Blade" Circular Saws and other Saws commonly used in saw mills, stave mills, planing mills, &c.; Planer, Molding and Stave Knives, &c.

E. S. HULBERT & Co., Bernardston, Mass.: Catalogue showing their line of Cutlery for the use of abattoirs, butchers, packers, hotel and restaurant chefs, grocery-men, marketmen, &c.

Trade Items.

GEORGE WRIGHT, 121 Fulton street, New York, is compiling an illustrated catalogue entitled "America's Greatest Manufacturers," somewhat on the line of a similar work issued in England recently, entitled "Britain's Greatest Manufacturers." This book will include the metal and engineering trades and is intended for home and foreign markets, containing illustrations of manufacturing plants, products, trade markets, &c., as well as interesting features of the leading American cities. When published the work will be distributed gratis in the important parts of the world.

THE DILLON-GRISWOLD WIRE COMPANY, Sterling, Ill., have issued an illustrated circular, which not only describes the Sterling Woven Wire Fence, but also gives full details of efficient methods of setting posts and anchoring and bracing straining posts, as well as stretching the fence. The company have brought out a new stretcher, which is ingeniously constructed and has been thoroughly tested. It is stated that it will stretch a roll of fence of any length and over any kind of ground, and is of so simple a character that a boy can operate it.

The daily press reports of a fire in the establishment of the Scott Hardware Company, Paducah, Ky., are without foundation. The company advise us that they have suffered no loss whatever from fire.

LEONARD J. LOMASNEY has been appointed general sales agent of the Peerless Rubber Mfg. Company, 16 Warren street, New York. Mr. Lomasney has had considerable business experience, having been connected for several years with the sales department of this company.

Among the Hardware Trade.

F. J. Bahr has purchased the Hardware, Stove, Agricultural Implement and Sporting Goods business of Nelson S. Miller, Eagle, Neb.

E. S. Clayton has bought the Hardware and Agricultural Implement business formerly conducted by Woods & Nowlin, Lewisburg, Tenn. Mr. Clayton expects to double the stock thus acquired and may also add a line of Buggies.

Starr & Arner, Clyde, Ohio, have bought the business of Jackson Hardware Company of that city, and will remove the stock to their own establishment.

Randall & Brown are a new firm at Fortville, Ind., handling Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, &c.

A. B. Ashley, formerly manager of the firm of W. H. Hale & Co., Milton, Vt., has commenced business under

his own name. Mr. Ashley carries a line of Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c.

Rehkopf & Siemon have disposed of their Hardware business in Douds, Iowa, to Hootmon & Siemon, who continue at the old stand.

T. B. Curtis has succeeded Curtis & Boyd, Hardware, Stove and Farm Implement merchants, Woodburn, Iowa.

W. J. Holloway has bought the Hardware, Stove, Farm Implement, Wagon and Buggy business of Tipton & Shenkle, Churdan, Iowa. Mr. Holloway occupies a new brick storeroom, 22 x 70 feet.

Clark Bros. & Smyser have been succeeded by Clark Bros. & Burger, Moulton, Iowa. The firm will shortly remove to a new building now being erected for their use.

Haas & Hatcher have sold out their Hardware, Stove, Farm Implement and Sporting Goods business in Lamoni, Iowa, to Graves & Yost.

C. B. Moffitt has succeeded Moffitt & Shumway, Dorchester, Neb., dealers in Shelf Hardware, Stoves, Tinware and Sporting Goods.

Hamilton & Rasberny have lately entered the Hardware, Stove, Tinware and Agricultural Implement business in Rochdale, Texas.

Griffith & Kolb, Rewey, Wis., have disposed of their business to Eastman Lumber Company.

Wm. M. Curtis is building an addition to his Hardware store in Ballard, Wash.

Frank Rettig has moved his Hardware business from North Manchester to Wabash, Ind.

C. I. Long has succeeded Long & Chew, dealers in Hardware, Harness, Stoves, Wind Mills, Buggies, &c., Hopeville, Iowa.

Culver Bros. are successors to Chas. J. Macbeth in the Hardware business in Mankato, Minn. Culver Bros. were formerly for 14 years in the general merchandise business at Button, S. D.

Boyle & Son have disposed of their stock of Hardware, Agricultural Implements, &c., in Liberal, Kan., to M. H. Schandrett.

Pinkley & De Long have purchased the Barnes Hardware store in Brink Haven, Pa.

W. B. Gislason has succeeded Gislason Bros., Minnesota, Minn., in the Hardware, Stove and Agricultural Implement business.

John F. Howe has recently embarked in business at Freedom, Beaver County, Pa. He carries a stock of Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, Plumbing Goods, Pipe Fittings, &c. He is also prepared to do all kinds of shop work, slating, tinning, steam and hot water heating, &c. Mr. Howe occupies a new brick building, which has been attractively fitted up with rolling step ladders, floor and wall cases and other modern store fixtures.

Cass-Damerel Hardware Company have succeeded Nauwerth & Cass Hardware Company, Los Angeles, Cal., wholesale and retail Shelf Hardware, Stoves, Plumbing, Tinning, Hot Air Furnaces, &c. The officers of the new company are B. H. Cass, president; C. W. Damerel, vice-president; C. G. Packard, secretary, and V. P. Brown, treasurer. Mr. Damerel, for a period exceeding 20 years, was a traveling salesman representing Hibbard, Spencer, Bartlett & Co.

The "E. R. Armentrout Hardware," Staunton, Va., are opening a new store at 4 S. Augusta street, in that city, handling Hardware, Stoves and House Furnishing Goods. Business will be continued at their old stand, 13 and 15 Johnson street, as heretofore. Both stores will be conducted under the same style.

The Meyer-Neville Hardware Company, Meridian, Miss., who commenced the wholesale and retail business on September 1, advise us that they are doing a large and increasing business and have found it necessary to double their force.

Wind Mill Pump Standards.

The Humphryes Mfg. Company, Mansfield, Ohio, are offering wind mill pumps with long fulcrum, as shown herewith. In Fig. 1 is illustrated a wind mill force pump which is the same as the company's H 425, with the addition of the long fulcrum. It is pointed out that the long fulcrum gives a great leverage, fitting the pump for deep well service. The stock is tapped for pipe connection just back of the spout, which is fitted with a detachable hose coupling. A wind mill lift pump is shown in Fig. 2, the standard being the same as the company's H 800, the addition of the long fulcrum making it, it is explained, easier to work. The stock is tapped just under the spout for pipe connection, so that no water stands in the spout, it is remarked, and there is no danger of freezing. The company are placing on the market a new enameled cylinder Pitcher pump, with



Fig. 1.—Wind Mill Force Pump Fig. 2.—Wind Mill Lift Pump
Standard, H 447. Standard, H 448.

best quality of enamel used for coating to make a smooth surface. The company are prepared to furnish any of their set length lift or force pumps with enameled cylinders.

Improvements in Rules.

The accompanying cuts represent improvements in brass bound rules which have been adopted on all bound and half bound rules manufactured by the H. Chapin's Son Company, Pine Meadow, Conn. A description of these improvements appeared in our issue, 25th ult., but a mistake was made in the captions given in connection with the cuts of the rule. The binding of the rules comes up full width and strength to the head, which allows the joint plates to fit in between, as in Fig. 1, this arrangement permitting the binding pin to be placed near the head, making, it is remarked, a perfect and strong joint. In Fig. 2 the middle joint is shown, the construction of which, it is explained, strengthens the rule at this point and adds to its appearance. The improvements, it is stated, add no extra cost to the rules.

In Fig. 3 is shown a combination rule and glass cutter, which the company are putting on the market. The

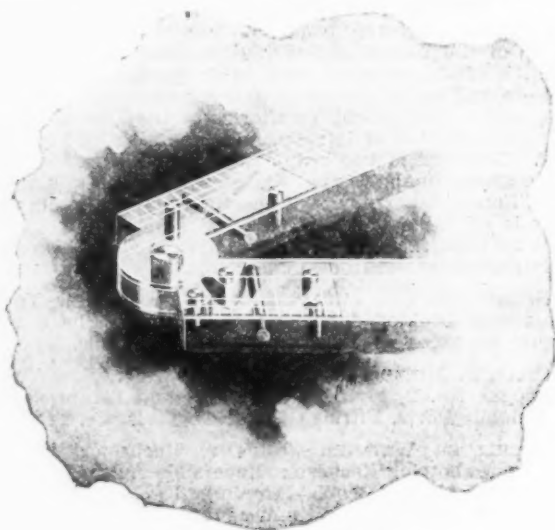


Fig. 1.—Improved Head Joint.

cutter wheel is made of fine hardened steel so as to be serviceable, and the rule is supplied with a glass breaker

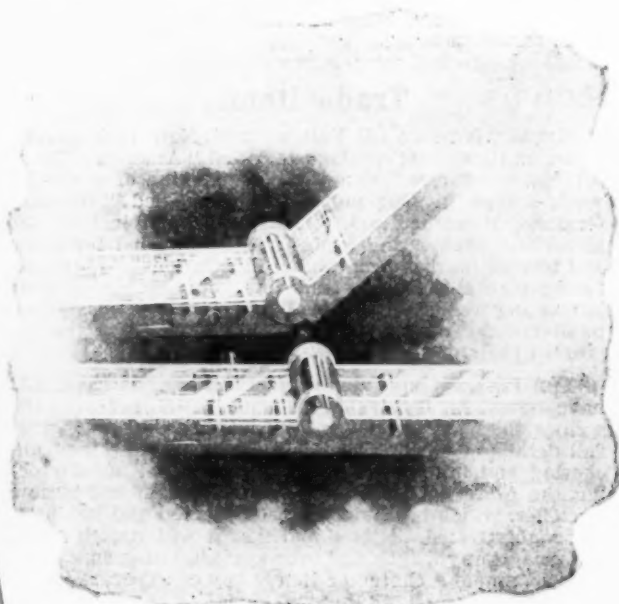


Fig. 2.—Improved Middle Joints.

in the head. Another good, simple way to break the glass, it is explained, is to slip it between the middle

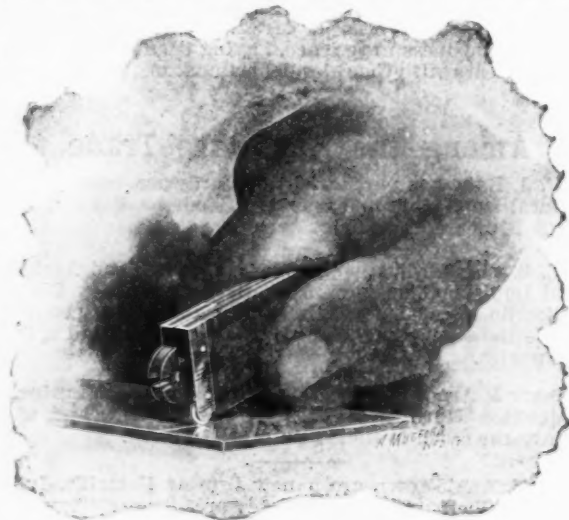


Fig. 3.—Combination Rule and Glass Cutter.

joints of the rule when closed and firmly held in the hand.

Southington Emery Wheel Dresser.

The improved emery wheel dresser herewith shown is put on the market by the Southington Cutlery Com-

pany. The handles are made from select sole leather, pressed on the square bar, so that, the manufacturers state, there will be no twist, break or pull out. The handles are referred to as being burnished like ebony



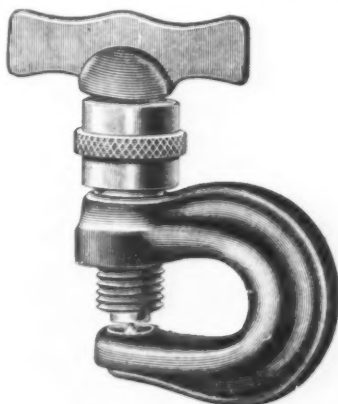
Southington Emery Wheel Dresser.

pany, Southington, Conn. In each set of cutters in the dresser are two broad tooth wheels, which, it is remarked, not only protect the wear of the cutters, but open a clean and level cutting surface on the wheel and prevent unnecessary waste. The cutters have a direct bearing, revolving on a hardened steel sleeve, the sleeve revolving on a steel screw. The manufacturers state that these cutters will wear a long time, that emery wheels will last longer where these dressers are used and that the cutters fit regular holders.

to give them the richest appearance possible. The tools are made in $\frac{1}{4}$, $\frac{5}{16}$ and $\frac{3}{8}$ inch sizes.

The Handy Riveter.

An illustration is given herewith of the Handy riveter, which is manufactured by the Milwaukee Au-

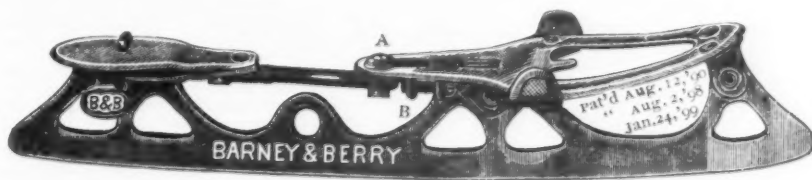


The Handy Riveter.

Lock Lever Heel Button Skate.

Barney & Berry, Springfield, Mass., have put on the market for this season's trade the lock lever heel button skate here illustrated. The blade of this skate in design is similar to that used on their safety edge hockey skate, brought out in a previous season, except that instead of being straight from heel to toe on the bottom of the blade, the blade is slightly curved for fancy or figure skating. This design while giving a strong blade is lighter in weight than that ordinarily used. They are made in all sizes, from 8 to 12 inches inclusive, rising by $\frac{1}{2}$ inch. The skate is also adjustable sideways upon any style or size of shoe. For an additional charge this skate will be assembled with bolts and nuts and furnished with a pair of safety edge hockey blades extra, thus making the skate interchangeable for figure or speed skating. When ordered for ladies' use this skate will be assembled with narrow foot plates. Grade 4 is ornamented and beveled, and grade 6 is ornamented and beveled and has a diamond toe. This entire line of skates is carried in stock for New York and adjacent territory

Automatic Machine Company, Milwaukee, Wis. The machine is operated by turning a thumb screw, which is referred to as powerful, to enable any size of tubular or bifurcated rivet to be perfectly clinched. The body and screw are made of malleable iron, the sleeve is made of



Lock Lever Heel Button Skate.

by Walter B. Stevens & Son, 114 Chambers street, New York.

Leather Handle Screw Drivers.

The accompanying illustration represents the Union brand of gunsmiths' and machinists' screw drivers, with

cold rolled steel and the plunger of hardened tool steel. It weighs 5 ounces, can easily be carried in the pocket and is designed for mending broken harness, straps, belts, &c.

Acme Hardware Company, H. G. Dyson, president, Richmond, Va., have been incorporated with a capital



Leather Handle Screw Drivers.

leather handles, just put on the market by the Union Mfg. Company, Buffalo, N. Y. The bits are drop forged from best tool steel, every tool being warranted by the

stock of \$10,000. They will conduct a wholesale and retail business in Hardware, Carriage and Wagon Materials, &c.

New York Wall Ties and Sleeper Clips.

The accompanying illustrations relate to ties and clips put on the market by Hurd & Co., 570-576 West Broadway, New York. The wall ties, shown in Fig. 1, are

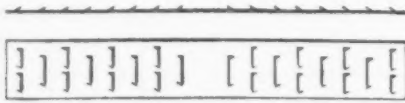


Fig. 1.—New York Sheet Metal Wall Tie.

made of cold rolled steel, $8\frac{1}{2}$ inches long and $1\frac{1}{4}$ inches wide, but can be made any length desired. The smaller cut shows a side view of the tie and the larger one a top view. The manner of applying the tie is shown in Fig. 2. In the rougher and cheaper construction of brick walls, where wall ties have been used, it is explained

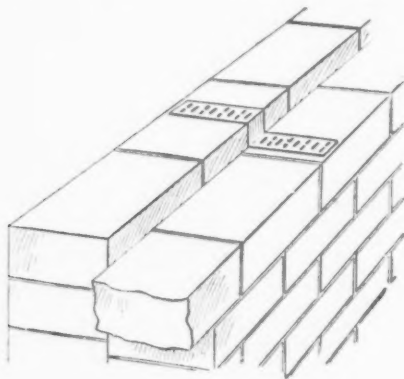


Fig. 2.—Application of Wall Tie

that a growing need has developed for a tie which is readily bent in order to conform to the unevenness of brick walls. The top of one brick may set from $\frac{1}{4}$ to $\frac{1}{2}$ inch below the adjoining brick to be bonded. The tie has been brought out to meet this condition. The strip

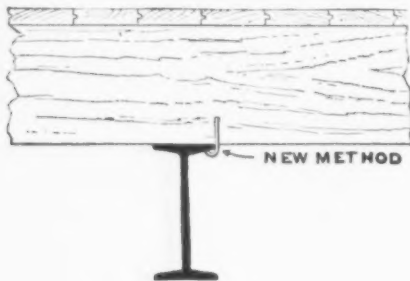


Fig. 3.—New York Sleeper Clip.

of metal has been sheared and formed, it is remarked, so that the inward directing projections insure a perfect grip. The sleeper clip and its application is shown in Fig. 3. The clip is made of 3-16 inch steel wire. In Fig. 4 is shown the old method of accomplishing the

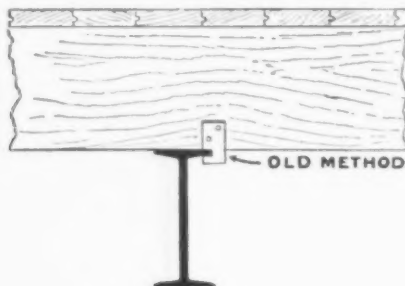


Fig. 4.—Former Style of Sleeper Clip.

same results. It is pointed out, with the old method, that there was not only the labor of holding the large piece of sheet iron in place, but that there was additional labor in driving two nails. The clip illustrated in Fig. 3 is in one piece, the sheared point allowing it to be driven

readily. The new clips are referred to as being much cheaper than the old style, and can be ordered any style or length. The firm signify their willingness to send samples and quotations of the tie and clip upon application.

The Hardware and Stove store of E. F. Warman, Mt. Vernon, Ill., was destroyed by fire on the 15th ult. Mr. Warman managed to save a large part of his Shelf Hardware and Stove stock, and has removed to temporary quarters.

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Current Hardware Prices.

REVISED NOVEMBER 6, 1900.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Cut Prices.—In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (May 3, 1900), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00...33 $\frac{1}{2}$ 10 $\frac{1}{2}$
North's...33 $\frac{1}{2}$ 10 $\frac{1}{2}$
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent...25 $\frac{1}{2}$ 5 $\frac{1}{2}$
Taplin's Perfection...50 $\frac{1}{2}$

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvil...7 $\frac{1}{2}$ 7 $\frac{1}{2}$
Hay-Budden...9 $\frac{1}{2}$ 9 $\frac{1}{2}$
Horseshoe brand, Wrought...9 $\frac{1}{2}$ 9 $\frac{1}{2}$
Samson...7 $\frac{1}{2}$ 7 $\frac{1}{2}$
Trenton, Wrought...7 $\frac{1}{2}$ 7 $\frac{1}{2}$
Huel Pat. Trenton Wrought...7 $\frac{1}{2}$ 7 $\frac{1}{2}$
Vulcan Wrought...8 $\frac{1}{2}$ 8 $\frac{1}{2}$

Imported—

Armitage's Mouse Hole...8 $\frac{1}{2}$ 8 $\frac{1}{2}$
Peter Wright's...9 $\frac{1}{2}$ 9 $\frac{1}{2}$

Anvil, Vise and Drill—

Millers Falls Co., \$18.00...20 $\frac{1}{2}$

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Hull & Hoyt Co.:
Lots of 1 doz...25 $\frac{1}{2}$
Smaller Lots...20 $\frac{1}{2}$
Lots of 3 doz...30 $\frac{1}{2}$

Augers and Bits—

Com. Double Spur...60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 70 $\frac{1}{2}$ 5 $\frac{1}{2}$
Boring Machine Augers...60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 70 $\frac{1}{2}$ 5 $\frac{1}{2}$

Car Bits, 12-in. twist...60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 70 $\frac{1}{2}$ 5 $\frac{1}{2}$

Jennings' Pattern:
Auger Bits...60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 70 $\frac{1}{2}$ 5 $\frac{1}{2}$

Ford's Auger Bits...40 $\frac{1}{2}$ 10 $\frac{1}{2}$ 40 $\frac{1}{2}$ 10 $\frac{1}{2}$

Forstner Pat. Auger Bits...25 $\frac{1}{2}$

C. E. Jennings & Co.:
No. 10 ext. tip, R. Jennings' list...40 $\frac{1}{2}$

No. 30, R. Jennings' list...50 $\frac{1}{2}$

Russell Jennings...35 $\frac{1}{2}$ 10 $\frac{1}{2}$ 35 $\frac{1}{2}$ 10 $\frac{1}{2}$

L'Hommieu's Car Bits 15 $\frac{1}{2}$ 10 $\frac{1}{2}$ 15 $\frac{1}{2}$ 10 $\frac{1}{2}$

Pugh's Black...20 $\frac{1}{2}$

Pugh's Jennings' Pattern...35 $\frac{1}{2}$

Snell's Auger Bits...60 $\frac{1}{2}$

Snell's Bell Hangers' Bits...60 $\frac{1}{2}$

Snell's Car Bits, 12-in. twist...60 $\frac{1}{2}$

Wright's Jennings Bits (R. Jennings' list)...50 $\frac{1}{2}$

Bit Stock Drills—

Standard List...65 $\frac{1}{2}$ 85 $\frac{1}{2}$ 10 $\frac{1}{2}$

Expansive Bits—

Clark's small, \$18; large, \$26...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Lavigne's Clark's Pattern, No. 1...10 $\frac{1}{2}$

doz., \$26; No. 2, \$18...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

C. E. Jennings & Co., Steer's Pat...33 $\frac{1}{2}$

Swan's...60 $\frac{1}{2}$

Gimlet Bits—

Common Double Cut, gro. \$2.00 @ 2.75

German Pattern...gro. \$3.25 @ 5.00

Double Cut, makers' lists...60 $\frac{1}{2}$ 50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Hollow Augers—

AMES...25 $\frac{1}{2}$ 10 $\frac{1}{2}$

Bouney's Adjustable, $\frac{1}{2}$ doz...\$16.00

New Patent...25 $\frac{1}{2}$ 10 $\frac{1}{2}$

Universal...20 $\frac{1}{2}$

Ship Augers and Bits—

Ford's...40 $\frac{1}{2}$

Snell's...40 $\frac{1}{2}$

C. E. Jennings & Co.:
L'Hommieu's...15 $\frac{1}{2}$ 10 $\frac{1}{2}$

Watrous'...40 $\frac{1}{2}$

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls:
Handled...gro. \$2.75 @ 5.10

Unhandl'd, Shouldered gro. 65 $\frac{1}{2}$ 60 $\frac{1}{2}$

Unhandl'd, Patent...gro. 66 $\frac{1}{2}$ 70 $\frac{1}{2}$

Peg Awls:
Unhandl'd, Patent...gro. \$1 @ 3 $\frac{1}{2}$

Unhandl'd, Shouldered gro. 65 $\frac{1}{2}$ 70 $\frac{1}{2}$

Scratch Awls:
Handled, Common...gro. \$5.50 @ 4.00

Handl'd, Socket...gro. \$11.50 @ 12.00

Awl and Tool Sets—See

Set, Awl and Tool.

Axes—

First Quality, best brands...\$6.25 @ 6.50

First Quality, other brands...\$6.00 @ 6.25

Jobbers' Special Brands:
Good Quality...\$5.00 @ 5.50

Best Quality...\$6.25

Cheap, Handled Axes...\$5.50 @ 5.75
Beveled, add 25c doz.

Axle Grease—See Grease, Axle.

Axles—

Concord, Loose Collar...45 $\frac{1}{2}$

Concord, Solid Collar...5 $\frac{1}{2}$ c

No. 1 Common...3 $\frac{1}{2}$ 5 $\frac{1}{2}$

No. 1 $\frac{1}{2}$ Com. New Style...3 $\frac{1}{2}$ 4 $\frac{1}{2}$

No. 2, Solid Collar...3 $\frac{1}{2}$ 4 $\frac{1}{2}$

Nos. 7, 8, 11 to 14...75 $\frac{1}{2}$ 10 $\frac{1}{2}$

Nos. 15 to 18...60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Nos. 19 to 23...75 $\frac{1}{2}$ 10 $\frac{1}{2}$

Boxes, A & C—

Common and Concord, not turned...15. 5c

Common and Concord, turned...lb. 6c

Half Patent...lb. 9c

Balances—

Sash—
Caldwell new list...50 $\frac{1}{2}$

Pulman's...60 $\frac{1}{2}$

Spring—
Spring Balances...50 $\frac{1}{2}$ 50 $\frac{1}{2}$

Chatillon's Light Sps. Balances...40 $\frac{1}{2}$ 10 $\frac{1}{2}$

Chatillon Straight Balances...40 $\frac{1}{2}$

Chatillon Circular Balances...50 $\frac{1}{2}$

Chatillon's Large Dial...80 $\frac{1}{2}$

Perduze...50 $\frac{1}{2}$

Barb Wire—See Wire, Barb.

Bars—

Crow—
Steel Crowbars, 10 to 40 lb., per lb...3 $\frac{1}{2}$ 4 $\frac{1}{2}$

Beams, Scales—

Scale Beams, List Jan. 12, '98...30 $\frac{1}{2}$ 30 $\frac{1}{2}$ 5 $\frac{1}{2}$

Chatillon's No. 1...30 $\frac{1}{2}$

Chatillon's No. 2...40 $\frac{1}{2}$

Beaters—

Egg—
Standard Co.:
No. 5 Steel Handle Diver, $\frac{1}{2}$ gro. \$6.50

No. 10 Cast Handle Diver, $\frac{1}{2}$ gro. \$8.00

No. 10 S&H Handle Diver, $\frac{1}{2}$ gro. \$8.00

No. 15 Extra Heavy Steel Handle, $\frac{1}{2}$ gro. \$15.00

Rival, $\frac{1}{2}$ gro. \$10.00

Taplin Mfg. Co.:
No. 50 Small Family size...\$6.50

No. 100 Regular Family size...\$8.00

No. 102 Regular Family size, tinned...\$9.50

No. 150 Large Family size...\$15.00

No. 152 Large Family size, tinned...\$17.00

Lyon's, Standard size... $\frac{1}{2}$ doz. \$1.75

Wonder (S. S. & Co.)... $\frac{1}{2}$ doz. \$7.50

Bellows—

Blacksmith, Standard List 70 $\frac{1}{2}$ 70 $\frac{1}{2}$ 5 $\frac{1}{2}$

C. E. Jennings & Co., Blacksmith...60 $\frac{1}{2}$ 10 $\frac{1}{2}$

C. E. Jennings & Co., Hand...33 $\frac{1}{2}$

Blacksmiths—

Inch...30 32 34 36 38 40

Each...\$3.70 3.95 4.55 5.10 5.70 6.55

Extra Length:
Each...\$4.25 4.85 5.40 5.95 6.50 7.95

Molders—

Inch...9 10 11 12 14 16

Doz...\$6.75 7.25 8.50 9.50 12.00 14.50

Hand—

Inch...6 7 8 9 10 12

Doz...\$3.75 4.25 4.50 5.00 5.75 6.75

Bells—

Cow—
Ordinary goods...75 $\frac{1}{2}$ 10 $\frac{1}{2}$

High grade...70 $\frac{1}{2}$ 10 $\frac{1}{2}$

Jersey...75 $\frac{1}{2}$ 10 $\frac{1}{2}$

Texas Star...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Door—

Abbe's Gong...45 $\frac{1}{2}$

Barton Gong...55 $\frac{1}{2}$

Gong, Yankee...55 $\frac{1}{2}$

Home, R. & E. Mfg. Co.'s...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Lever and Pull, Sargent's...20 $\frac{1}{2}$ 10 $\frac{1}{2}$

Hand—

Hand Bells, Polished...60 $\frac{1}{2}$ 10 $\frac{1}{2}$

White Metal...55 $\frac{1}{2}$ 10 $\frac{1}{2}$

Nickel Plated...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Swiss...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Silver Chrome...30 $\frac{1}{2}$ 10 $\frac{1}{2}$

Miscellaneous—
Farm Bells...lb. 2 $\frac{1}{2}$ 3 $\frac{1}{2}$

Steel Alloy Church and School...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Willmot & Hobbs Mfg. Co., Gongs...70 $\frac{1}{2}$

Belt—
Common Standard...75 $\frac{1}{2}$ 75 $\frac{1}{2}$ 10 $\frac{1}{2}$

Standard...60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Extra...60 $\frac{1}{2}$

High Grade...50 $\frac{1}{2}$

Leather—
Extra Heavy, Short Lap...50 $\frac{1}{2}$ 10 $\frac{1}{2}$ 60 $\frac{1}{2}$

Regular Short Lap 60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Standard...60 $\frac{1}{2}$ 10 $\frac{1}{2}$ 60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Light Standard...70 $\frac{1}{2}$ 70 $\frac{1}{2}$ 5 $\frac{1}{2}$

Cotton—

Rossendale-Reddaway B. & H. Co.:
Sphinx Brand...60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Durable Brand...70 $\frac{1}{2}$

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters...20 $\frac{1}{2}$

Stoddard's Lightning Tire Upsetters...40 $\frac{1}{2}$ 50 $\frac{1}{2}$

Bicycle Goods—

John S. Lang's Son's 1899 list:
Chain...50 $\frac{1}{2}$

Spokes...50 $\frac{1}{2}$

Tub...60 $\frac{1}{2}$

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—
See Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Ad-

justers, Blind.

Blind Fasteners—See Fast-

eners, Blind.

Blind Staples—See Staples, Blind.

Blocks—Tackle—

Common Wooden...70 $\frac{1}{2}$ 70 $\frac{1}{2}$ 10 $\frac{1}{2}$

Cleveland Steel...50 $\frac{1}{2}$ 10 $\frac{1}{2}$ 60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Eddy's Steel...60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Hartz Steel...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Ford's Star Brand Self Lubricating...60 $\frac{1}{2}$ 10 $\frac{1}{2}$

Hollow Steel, Ford's Pat. Star Brand...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Lane's Patent Automatic Lock and Junior...30 $\frac{1}{2}$

Stowell's Novelty, Mal. Iron...50 $\frac{1}{2}$

See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c...50 $\frac{1}{2}$ 10 $\frac{1}{2}$

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

H. B. Caps, Con. Ball Sued.	\$1.90
H. B. Caps, Round Ball.	\$1.12 @ 1.18
Blank Cartridges:	
38 C. F., 50 yd.	10¢
38 C. F., 70 yd.	10¢
22 cal. Rim., 150 yd.	10¢
22 cal. Rim., 270 yd.	10¢
Central Fire	2¢
Patrol and Rifle	15¢
Primed Shells and Bullets	15¢
Rim Fire Sporting	50¢
Rim Fire, Military	15¢

Castors—

Bed.	70¢ @ 70¢ 10¢
Patrol	75¢ @ 75¢ 5¢
Patrol-Alpha	75¢ @ 75¢ 10¢
Boss	70¢ @ 10¢
Boss Anti-Friction	70¢ @ 10¢
Martin's Patent (Phonix)	45¢
Payson's Anti-Friction Furniture	70¢ @ 10¢
Payson's Anti-Friction Truck	70¢ @ 10¢
Standard Ball Bearing	30¢
Tucker's Patent, low list	30¢

Cattle Leaders—

See Leaders, Cattle.

Chain—

American Coil, Full Casks:	
3 16 1/2 5-16 3/4 7-16 1/2 9-16	
7-25 5-35 1-35 5-50 3-55 3-55 3-15	
3/4 3/4 3/4 to 1 1/4 inch.	
3.10 3.05 3.00 cents per lb.	
Less than Cask lots add 40¢ per 10 lbs.	
German Coil, list July 24, '97, 60¢ @ 10¢	
German Halter Chain, list July 24, '97	60¢ @ 10¢
Traces, Western Standard: 100 pair	
6 1/2-8, Straight, with ring.	\$20.00
6 1/2-8, Straight, with ring.	\$27.00
6 1/2-8, Straight, with ring.	\$31.00
6 1/2-10, Straight, with ring.	\$35.00
Add 2¢ per pair for Hooks.	
Twist Traces 2¢ per pair higher than	
Straight Link.	

Trace, Wagon and Fancy Chains.

list April, '98.	60¢ @ 10¢ @ 60¢
Jack Chain, list July 10, '93	

Iron.

Brass.	60¢ @ 60¢ 10¢
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Safety Chain.

100 lb. Pump Chain.	10¢ @ 5¢ 4¢
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Covered Sled Works.

Breast, Hitching and Reel Chains.	50¢
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Cover Mfg. Co.

Halter.	35¢ @ 2¢
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Hoel.

Hoel.	35¢ @ 2¢
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Rein.

Rein.	35¢ @ 2¢
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Stallion.

Stallion.	35¢ @ 2¢
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Onida Community.

Eureka Coll and Halter.	60¢ @ 60¢ 5¢
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Niagara Coll and Halter.

Niagara Coll and Halter.	60¢ @ 60¢ 5¢
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Niagara Coll and Halter.

Niagara Coll and Halter.	60¢ @ 60¢ 5¢
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Am. Coll and Halters.

Am. Coll and Halters.	50¢ @ 10¢ 5¢ 60¢
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Am. Cow Ties.

Am. Cow Ties.	35¢ @ 5¢ 40¢ 5¢
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Wire Goods Co.

Wire Goods Co.	60¢
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Universal Dbl-Jointed Chain.

Universal Dbl-Jointed Chain.	45¢
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Chalk—(From Jobbers.)

Carpenters', Red.	gro. 45¢
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Carpenters', Blue.

Carpenters', Blue.	gro. 40¢
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Carpenters', White.

Carpenters', White.	gro. 35¢
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See also Crayons.**Chalk Lines—See Lines.****Checks, Door—**

Bardley's.	40¢ @ 10¢
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Columbia.

Columbia.	50¢ @ 10¢
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Kolpse.

Kolpse.	60¢ @ 60¢ 10¢
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Chests, Tool—

American Tool Chest Co.	
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Boys' Chests, with Tools.

Boys' Chests, with Tools.	55¢
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Gentlemen's Chests, with Tools.

Gentlemen's Chests, with Tools.	40¢
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Farmers', Carpenters', etc., Chests.

Farmers', Carpenters', etc., Chests.	30¢
--------------------------------------	-----

with Tools.

with Tools.	30¢
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Machinists' and Pipe Fitters' Chests.

Machinists' and Pipe Fitters' Chests.	50¢
---------------------------------------	-----

Empty.

Empty.	50¢
--------	-----

C. E. Jennings & Co.'s Machinists' Tool

C. E. Jennings & Co.'s Machinists' Tool	25¢ @ 25¢ 10¢
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Chisel

Chisel	25¢ @ 25¢ 10¢
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Socket Framing and Finner

Socket Framing and Finner	70¢ @ 70¢ 10¢
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Standard List.

Standard List.	70¢ @ 70¢ 10¢
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Buck Bros.

Buck Bros.	30¢
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Charles Buck

Charles Buck	30¢
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C. E. Jennings & Co. Socket Finner

C. E. Jennings & Co. Socket Finner	30¢
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No. 10.

No. 10.	60¢ @ 10¢
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C. E. Jennings & Co. Socket Framing

C. E. Jennings & Co. Socket Framing	60¢ @ 10¢
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No. 15.

No. 15.	60¢ @ 10¢
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Swan's

Swan's	70¢ @ 5¢
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L. & L. J. White.

L. & L. J. White.	30¢ @ 30¢ 5¢
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Tanged—

Tanged—	40¢ @ 40¢ 10¢
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Tanged Firmers.

Tanged Firmers.	40¢ @ 40¢ 10¢
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Buck Bros.

Buck Bros.	30¢
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Charles Buck

Charles Buck	30¢
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C. E. Jennings & Co. N's 191, 181.

C. E. Jennings & Co. N's 191, 181.	25¢
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L. & L. J. White, Tanged.

L. & L. J. White, Tanged.	25¢ @ 5¢
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Cold Chisels, good quality lb. 14¢ @ 16¢

Cold Chisels, good quality lb. 14¢ @ 16¢	
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Cold Chisels, fair quality.

Cold Chisels, fair quality.	lb. 12¢
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Cold Chisels, ordinary.

Cold Chisels, ordinary.	lb. 8¢ @ 9¢
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Chucks—

Chucks—	20¢ @ 20¢
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Beach Pat., each \$8.00.

Beach Pat., each \$8.00.	20¢
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Skinner Patent Chucks.

Skinner Patent Chucks.	40¢
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Combination Lathe Chucks.

Combination Lathe Chucks.	40¢
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Drill Chucks, Patent and Standard.

Drill Chucks, Patent and Standard.	25¢
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Drill Chucks, New No. 10.

Drill Chucks, New No. 10.	25¢
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Independent Lathe Chucks.

Independent Lathe Chucks.	20¢
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Improved Planer Chucks.

Improved Planer Chucks.	40¢
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Universal Lathe Chucks.

Universal Lathe Chucks.	40¢
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Face Plate Jaws.

Face Plate Jaws.	35¢
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Standard Tool Co.

Standard Tool Co.	45¢
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Improved Drill Chuck.

Improved Drill Chuck.	45¢
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Union Mfg. Co.

Union Mfg. Co.	40¢
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Combination.

Combination.	40¢
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Geared Scroll.

Geared Scroll.	30¢
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Independent.

Independent.	40¢
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Union Drill.

Union Drill.	40¢
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Universal.

Universal.	40¢
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Face Plate Jaws.

Face Plate Jaws.	35¢
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Clamps—

Clamps—	20¢ @ 20¢ 5¢
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Adjustable, Steamers.

Adjustable, Steamers.	30¢
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Adjustable, Sargent's.

Adjustable, Sargent's.	45¢ @ 10¢
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Carriage Makers', P. S. & W. Co.

Carriage Makers', P. S. & W. Co.	40¢ @ 10¢
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Carriage Makers' Sargent's.

Carriage Makers' Sargent's.	50¢ @ 10¢
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Beaver, Parallel.

Beaver, Parallel.	35¢ @ 10¢
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1-man, Union Dr. & Forge & Tool

1-man, Union Dr. & Forge & Tool	40¢
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Saw Clam, 8-10 Ties, Sine Filters.

Saw Clam, 8-10 Ties, Sine Filters.	40¢
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Cleaners Walk—

Star Socket, All Steel.	40¢ net
Star Shank, All Steel.	40¢ net

W. & C. Shank, All Steel.

W. & C. Shank, All Steel.	40¢ net
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Cleavers, Butchers'—

Foster Bros.	30¢
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New Haven Edge Tool Co.

New Haven Edge Tool Co.	40¢ @ 10¢
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Nichols Bros., Flat hdl., 30¢; Rd. hdl., 40¢

Nichols Bros., Flat hdl., 30¢; Rd. hdl., 40¢	
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Fayette R. Plumb.

Fayette R. Plumb.	35¢ @ 35¢ 10¢
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P. S. & W.

P. S. & W.	35¢ @ 35¢ 10¢
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L. & J. White.

L. & J. White.	25¢
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Clippers—

Chicago Flexible Shaft Company	
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Handy Toilet.

Handy Toilet.	40¢ @ 70¢ 20¢
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Mascotte Toilet.

Mascotte Toilet.	40¢ @ 70¢ 20¢
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Monitor Toilet.

Monitor Toilet.	40¢ @ 70¢ 20¢
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Stewart's Patent.

Stewart's Patent.	40¢ @ 70¢ 20¢
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Clips, Axle—

Eagle and Superior 1/4 and 5-16	
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inch.

inch.	70¢ @ 10¢
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Norway, 1/4 and 5-16 inch.

Norway, 1/4 and 5-16 inch.	70¢ @ 10¢
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Cloth and Netting, Wire

Cloth and Netting, Wire	—See Wire, &c.
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Cocks, Brass—

Hardware list (Globe, Kerosene,	
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Lever Bibbs, Racking, &c.)

Lever Bibbs, Racking, &c.)	70¢ @ 70¢ 10¢
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Coffee Mills—See Mills, Coffee.**Collars Dog—**

Brass, Pope & Stevens' list.	40¢
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Embossed, Gilt, Pope & Stevens' list

Embossed, Gilt, Pope & Stevens' list	30¢ @ 10¢
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Leather Pope & Stevens' list

Leather Pope & Stevens' list	40¢
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Compasses, Dividers, &c.

Ordinary Goods.

Cimlots—

Nail, Metal, Assorted, gro. \$1.50@1.75
 Nail, Metal, Assorted, gro. \$3.00@3.50
 Nail, Wood Handled, Assorted, gro. \$4.00@4.25
 Nail, Wood Handled, Assorted, gro. \$5.00@5.25

Class, American Window

Jobbers' List, Sept. 1, 1900
 Small lots from store: 35¢@37¢
 Single Strength, all sizes, 35¢@37¢
 Double Strength, all sizes, 35¢@37¢
 10¢ to be added on all first quality, 10¢ Single and Double.

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush, 37¢@50¢
 List B, Cans (½ pts., pts., qts.), 35¢@45¢
 List C, Cans (½ gal., gal.), 35¢@45¢

Glue Pots—See Pots, Glue.**Grease, Axle—**

Common Grade, gro. \$5.00@6.00
 Dixon's Everlasting, 10-lb pails, ea. 85¢
 Dixon's Everlasting, in bxs., 1 doz. 1 lb. \$1.20; 2 lb. \$2.00
 Snow Flake: 1 qt. cans per doz. \$2.00; 2 qt. \$3.20; 3 gal. cans per doz. \$6.00; 3 gal. \$8.00; 5 gal. \$24.00

Grindstone Fixtures—

See Fixtures, Grindstone.

Guards, Snow—

Cleveland Wire Spring Co.: Galv. Steel #1000, \$9.00
 Copper #1000, \$18.00

Gun Powder—See Powder.**Hack Saws—See Saws.****Hafts, Awl—**

Peg Patent, Leather Top, \$4.90@5.25
 Peg Patent, Plain Top, \$3.50@3.75
 Sewing, Brass Ferrule, \$1.50@1.60
 Saddlers', Brass Ferrule, \$1.35@1.45
 Peg, Common, \$1.25@1.35
 Brad, Common, \$1.50@1.75

Halters and Ties—

Covert Mfg. Co., Web, 45¢@25¢
 Covert Mfg. Co., Jute Rope, 45¢@25¢
 Covert Mfg. Co., Sisal Rope, 30¢@25¢
 Covert's Saddlery Works, 96 list, Web, 60¢@10¢
 Covert's Saddlery Works, Leather, 60¢@10¢
 Covert's Saddlery Works, Jute, 60¢@10¢
 Covert's Saddlery Works, Sisal, 60¢@10¢
 Covert's Saddlery Works, Manila, 60¢@10¢
 Covert's Saddlery Works, Cotton, 70¢@10¢

Hammer—

Handled Hammers—
 Heller's Machinists', 50¢@50¢
 Heller's Carriers', 50¢@50¢
 Magnetic Tack, Nos. 1, 2, 3, \$1.50, 40¢@10¢
 Peck, Stow & Wilcox, 40¢@40¢
 Fayette E. Plumb: Plumb, A. E. Nail, 40¢@40¢
 Engineers' and B. S. Hand, 40¢@40¢
 Machinists' Hammers, 60¢@70¢
 60¢@70¢
 Riveting and Timbers', 50¢@50¢
 Sargent's C. S. New List, 45¢@10¢

Heavy Hammers and Sledges—

\$ lb. and under, lb. 45¢
 \$ to 5 lb., lb. 50¢
 \$ to 10 lb., lb. 60¢
 \$ to 15 lb., lb. 70¢
 \$ to 20 lb., lb. 80¢
 \$ to 25 lb., lb. 90¢
 \$ to 30 lb., lb. 1.00

Handcuffs and Leg Irons

See Police Goods.

Handles—

Agricultural Tool Handles—
 Hoe Rake, Fork, etc., 60¢@60¢
 Shovel, etc., Wood D Handle, 50¢@50¢

Cross-Cut Saw Handles—

Atkins', 40¢@50¢
 Champion, 45¢@45¢
 Diston's, 50¢

Mechanics' Tool Handles—

Auger, assorted, gro. \$2.40@2.60
 Auger, large, gro. \$2.85@3.00
 Brad Axl., gro. \$1.50@1.75
 Chisel Handles: Apple Tanged Firmer, gro. ass'd, \$2.25@2.35; large, \$2.50@2.60
 Hickory Tanged Firmer, gro. ass'd, \$1.75@2.25; large, \$2.50@2.60
 Apple Socket Firmer, gro. ass'd, \$1.75@2.25; large, \$2.50@2.60
 Hickory Socket Firmer, gro. ass'd, \$1.60@1.75; large, \$1.75@1.80
 Hickory Socket Framing, gro. ass'd, \$2.50@2.75; large, \$2.65@2.85
 File, assorted, gro. \$1.00@1.15
 Hammer, Hatchet, Axe, etc., 60¢
 Hand Saw, Varished, doz. 75¢@80¢
 Not Varished, 55¢@60¢
 Plane Handles: Jack, doz. 25¢@30¢; Jack Bolted, 55¢@60¢
 Fore, doz. 35¢@38¢; Fore, Bolted, 70¢@75¢

Hangers—

Barn Door, New Pattern, Round Groove, Regular: 1/2 in. 3 4 5 6 8
 Doz. \$1.10 1.45 1.80 2.10 2.75
 Barn Door, New England Pattern, Check Back, Round Groove, Regular: 1/2 in. 3 4 5 6
 Doz. \$1.50 2.00 2.60 3.25
 Chicago Spring Butt Co.: Friction, 25¢
 Oscillating, 25¢
 Big Twin, 25¢
 Chisholm & Moore Mfg. Co.: Baggage Car Door, 50¢
 Elevator, 40¢
 Coleman Hardware Mfg. Co.: Czar Ball Bearing, pair \$7.50
 No. 10 Roller Bearing, doz. pr. 4.50
 No. 20 Roller Bearing, doz. pr. 4.50
 Nickel, 50¢
 J. G. Sargent, 50¢@10¢
 Cronin & Co.: 1000's Axle, 40¢
 Roller Bearing, 60¢@10¢
 Lane Bros.: Parlor, Standard, \$3.25
 Parlor, New Model, \$2.75
 Barn Door, Standard, 45¢@10¢
 Covered, 50¢@10¢
 Special, 60¢@10¢
 Lawrence Bros.: Advance, 60¢
 Cleveland, 60¢@10¢
 Crown, 60¢
 New York, 60¢
 Peerless, 60¢@10¢
 Sterling, 60¢
 McKinney Mfg. Co.: No. 2, Standard, \$1.18
 No. 1, Special, \$1.13
 Stowell Mfg. and Foundry Co.: Badger, 60¢
 Baggage Car Door, 35¢@45¢
 Climax Anti-Friction, 50¢
 Elevator, 50¢@10¢
 Interstate, 50¢@10¢
 Magic, 50¢
 Matchless, 50¢@10¢
 Nathan, 50¢@10¢
 Parlor Door, 50¢
 Railroad, 50¢@10¢
 Street Car Door, 50¢@10¢
 Steel, Nos. 300, 400, 500, 40¢@15¢
 Wild West, 50¢@5¢
 Zenith for Wood Track, 50¢@10¢
 Taylor & Boggs Foundry Co.: Kidder's, 50¢@50¢
 Van Wagoner & Williams Hdw. Co.: American Trackless, 33¢@10¢
 Wilcox Mfg. Co.: Bike Roller Bearing, 60¢@10¢
 C. J. Roller Bearing, 60¢@10¢
 Cycle Ball Bearing, 60¢
 Dwarf Ball Bearing, 40¢
 Ives, Wood Track, 60¢@10¢
 L. T. Roller Bearing, 60¢@10¢
 New Era Roller Bearing, 50¢@10¢
 O. K. Roller Bearing, 60¢@10¢
 Prindle, Wood Track, 60¢
 Richards' Wood Track, 60¢
 Steel Steel Track, 60¢@10¢
 Schweizer Roller Bearing, 60¢@10¢
 Tandem Nos. 1 and 2, 60¢
 Underwriters' Roller Bearing, 40¢
 Wilcox Auditorium Ball Bearing, 30¢
 Wilcox Barn Trolley No. 123, 40¢
 Wilcox Fire Trolley, Roller Bearing, 30¢
 Wilcox L. Roy Noiseless Ball Bearing, 40¢
 Wilcox New Century, 50¢@10¢
 Wilcox Trolley Ball Bearing, 40¢

Harness Menders—See Menders.**Harness Snaps—See Snaps.****Hasps—**

Mohr's Perfect Hasp, 40¢@10¢
 Wrought Hasps, Staples, etc.—See Wrought Goods.

Hatchets—

Best Brands, 40¢@10¢
 Cheaper Brands, 50¢@10¢
 Note.—Net prices often made.

Hay and Straw Knives—

See Knives.

Hinges—

Blind and Shutter Hinges—
 Surface Gravity Locking Blind: (Victor; National; 1838 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)
 No. 1 3 5
 Doz. pair \$0.75 1.55 2.60
 Mortise Shutter: (L. & P., O. S., Dixie, etc.)
 No. 1 1 1/2 3
 Doz. pair \$0.65 .60 55 .47
 Mortise Reversible Shutter, (Buffalo, etc.)
 No. 1 1 1/2 3
 Doz. pair \$0.65 .60 55 .47
 Parker: North's Automatic Blind Pictures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50
 Reading's Gravity, 75¢@10¢
 Sargent's, Nos. 1, 3, 5, 60¢@10¢
 Sargent's, Nos. 1 & 18, 70¢@10¢
 Wright's Hardware Co.: O. S. Lull & Porter, 30¢@25¢
 Acme, Lull & Porter, 75¢@10¢
 Queen City Reversible, 75¢@10¢
 Stenger's Positive Locking, Nos. 1 & 3, 70¢@10¢
 Shepard's Noiseless, Nos. 60, 65, 55, 70¢@10¢
 Niagara, Gravity Locking, Nos. 1, 3 & 5, 75¢@10¢
 1908, Old Pat'n. Nos. 1, 3 & 5, 75¢@10¢
 Tip Pat'n. Nos. 1, 3 & 5, 75¢@10¢
 Buffalo Gravity Locking, Nos. 1, 3 & 5, 75¢@10¢
 Shepard's Double Locking, Nos. 21 & 25, 70¢@10¢
 Champion Gravity Locking, No. 75, 75¢@10¢
 Steamboat Gravity Locking, No. 10, 75¢@10¢
 Pioneer, Nos. 960, 45 & 5, 75¢@10¢
 Empire, Nos. 101 & 103, 70¢@10¢
 W. H. Co.'s Mortise Gravity Locking, No. 2, 60¢@10¢

Stanley's Steel Gravity Blind Hinges.

1/2 doz. sets \$1.20, 20¢@10¢

Gate Hinges—

Clark's or Shepard's—Doz. sets: No. 1 2 3
 Hinges with Latches, \$1.90 2.50 4.25
 Hinges only, 1.30 1.55 3.20
 Latches only, 0.70 0.70 1.20

New England: With Latch

Without Latch, doz. \$1.75@1.80
 Reversible Self-Closing: With Latch, doz. \$1.65@1.75
 Without Latch, doz. \$1.30@1.35

Western: With Latch

Without Latch, doz. \$1.00@1.05

Wrightsville Hardware Co.: Shepard's or Clark's, Nos. 1 & 2, 65¢@35¢**Spring Hinges—**

Holdback, Cast Iron, gro. \$9.00@10.00
 Non-Holdback, Cast Iron, gro. \$7.00@7.50

J. Bardsley

Bardsley's Patent Checking, 15¢
 Bommer Bros.: Bommer's, 33¢@45¢
 Chicago Spring Butt Co.: Chicago, 20¢
 Floor Hinge, 40¢
 Garden City Engine House, 20¢
 Keene's Saloon Door, 20¢
 Triple End, 40¢
 Coleman Hdw. Co.: Champion Holdback, \$ gr. 10.00
 J. G. C., \$ gr. 8.50
 Nickel, \$ gr. 9.00
 Lawson Mfg. Co.: M'ch'l ss, 30¢
 M'ch'l ss, 35¢
 Payson Mfg. Co.: Oblique, Dbl. Acting, 50¢@50¢
 Stover Mfg. Co.: Ideal, No. 16, Detachable, \$ gr. 2.50
 Ideal, No. 4, \$ gr. 2.50
 New Idea No. 4, \$ gr. 9.00
 New Idea, Double Acting, 45¢
 Van Wagoner & Williams Hdw. Co.: Acme, Wrt. Steel, 30¢
 Acme, Brass, 20¢
 American, 30¢
 Columbia, No. 14, \$ gr. 80.00
 Columbia, No. 18, \$ gr. 85.00
 Columbia, Adjustable, 30¢
 Gem, new list, 25¢
 Clover Leaf, \$ gr. 12.50
 Oxford new list, 25¢

Wrought Iron Hinges—

Strap and T Hinges, etc., list Mar. 15, 1898:

Light Strap Hinges, 66¢@5¢
 Heavy Strap Hinges, 70¢
 Light T Hinges, 50¢@1¢
 Heavy T Hinges, 60¢@10¢
 Extra Heavy T Hinges, 60¢@10¢

Hinge Hasps

Cor. Heavy Strap, 70¢
 Cor. Ex. Heavy T, 66¢
 Rolled Plate, 70¢@70¢
 Screw Hook: 6 to 13 in., lb. 2 1/2@3 c
 12 to 20 in., lb. 2 1/2@2 1/2 c
 22 to 36 in., lb. 3 1/4@2 1/2 c
 Screw Hook and Eye: 3/4 to 1 inch, lb. 6 1/2@8 c
 1 to 1 1/2 inch, lb. 6 1/2@7 c
 1 1/2 to 2 inch, lb. 7 1/2@8 c

Hods, Coal—

Galv. Open, \$2.05 2.20 2.45 2.65 2.85 doz.
 Jap. Open, \$1.55 1.70 1.85 2.05 2.25 doz.
 Galv. Funnel, \$2.75 2.90 3.10 3.35 3.55 doz.
 Jap. Funnel, \$2.00 2.15 2.35 2.50 2.70 doz.

Hoes—Eye—

Scovill and Oval Pattern, 60¢@50¢
 Grub. list Feb. 23, 1899, 65¢@55¢
 D. & H. Scovill, 35¢

Handled—

Sept. 1, 1900, List:

Field and Garden, 75¢@1¢
 Ladies', Boys', Toy and Onion, 70¢@10¢
 Street and Mortar, 75¢@7 1/2¢
 Cotton, 70¢@10¢
 Planters', 70¢@30¢
 Weeding, 75¢
 Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.

Fe. Madison Crucible Garden Hoe

75¢@3¢
 Fe. Madison Crescent Cultivator Hoe, per doz. 75¢@10¢
 Fe. Madison Mattock Hoes: Junior Weight, \$ doz. \$4.50
 Regular Size, \$ doz. \$4.00
 Fe. Madison Sprouting Hoe, \$ doz. \$4.80
 Fe. Madison Dixie Tobacco Hoe, 75¢@30¢
 Kretzinger's Cut Easy, per doz. 75¢@25¢
 Warren Hoe, 60¢
 W. & C. Ivanhoe, 75¢@3¢
 B. B. Cultivator Hoe, 75¢@10¢
 Acme Weeding, 75¢@10¢
 W. & C. Lightning Shuffle Hoe, \$ doz. \$5.50

Hog Rings and Rings—

See Rings and Rings.

Hoisting Apparatus—

See Machines, Hoisting.

Hollow Ware—

See Ware, Hollow.

Holders—

Bit—Angular, \$ doz. \$24.00, 45¢@10¢

File and Tool—

C. E. Jennings & Co. Mod. I Tool Holders, 33¢@45¢
 Nicholson File Holders and File Handles, 33¢@45¢

Hooks—Cast Iron—

Bird Cage, Reading, 50¢@10¢
 Bird Cage, Sargent's List, 50¢@10¢
 Clothes Line, Sargent's List, 20¢@10¢
 Clothes Line, Stov. v. a, 70¢
 Clothes Line, Reading List, 65¢@10¢

Coat and Hat, Stowell's

70¢
 Coat and Hat, Reading, 70¢@75¢
 Coat and Hat, Sargent's List, 35¢@10¢
 Coat and Hat, Wrightsville, 65¢@10¢
 Harness, Reading List, 70¢@10¢

Wire—

Atlas, Coat and Hat, 45¢
 10 Case Lots, 45¢@10¢
 Czar Harness, 50¢@10¢
 Wire Coat and Hat, 50¢@10¢
 Acme, 50¢@10¢
 B. B., 50¢@10¢
 V. Brace, Chief and Czar, 50¢@10¢
 Gem, 50¢@10¢
 Bright Wire Goods—See Wire.

Wrought Iron—

Box, or Case, Octagon Steel, doz. \$3.10@2.20
 Cotton, doz. \$1.05@1.15

Wrought Staples, Hooks, etc.—

See Wrought Goods.

Miscellaneous—

Bush, Light, doz. \$5.50; Medium, \$6.00; Heavy, \$6.50

Grass, Nos. 1 2 3 4
 Best, \$1.50 1.75 2.00
 Common, \$1.40 1.60 1.75
 Potato and Manure, 70¢
 Whiffletree, lb. 4 1/2¢
 Hooks and Eyes: Brass, 60¢@10¢
 Malleable Iron, 70¢@5¢
 Covert Saddlery Works' Self Locking Gate and Door Hook, 60¢@10¢
 Crown Picture, 50¢@10¢
 Bench Hooks—See Bench Stops.
 Corn Hooks—See Knives, Corn.

Horse Nails—See Nails, Horse**Horseshoes—**

See Shoes, Horse.

Hose Rubber—

Garden Hose, 3/4-inch: Competition, ft. 4 1/4 @ 4 1/4 c
 3-ply Standard, ft. 5 @ 6 c
 4-ply Standard, ft. 8 @ 9 c
 5-ply extra, ft. 9 @ 10 c
 4-ply extra, ft. 11 @ 11 c
 Cotton Garden, 3/4-inch, coupled: Low Grade, ft. 8 @ 7 c
 Fair quality, ft. 8 @ 9 c

Irons—Sad—

From 1 to 10, lb. 3 @ 3 1/4 c
 B. B. Sad Irons, lb. 3 1/4 @ 4 c
 Chinese Laundry, lb. 5 @ 6 c
 Chinese Sad, lb. 3 1/4 @ 3 1/4 c
 Mrs. Potts', per set: Nos. 50 55 60 65
 78c 69c 82c 79c
 New England Pressing, lb. 3 1/4 @ 3 1/4 c

Soldering—

Soldering Coppers, 1 & 1 1/2 lb., \$1 @ 2 1/2 c
 25c; 3 lb., 19 @ 21 c
 Covert Mfg. Co., 20 @ 25 c

Pinking—

Pinking Irons, doz. 50¢@60¢

Jack Screws—See Screws.**Jacks, Wagon—**

Covert Mfg. Co., Steel, 45¢@25¢
 Daisy, 70¢
 Lockport, 40¢@40¢
 Victor, 60¢
 Lane's Steel, 40¢

Kettles—

Brass, Span, Plain, 20¢@25¢
 Enamelled and Cast Iron—See Ware, Hollow.

Knife Sharpeners—

See Sharpeners, Knife.

Knives—

Butcher, Shoe, &c.—
 Dick's Butcher Knives, 40¢
 Foster Bros' Butcher, &c., 80¢
 Nichols' Butcher Knives, 50¢
 Hay and Straw—See Hay Knives.

Corn—

Fe. Madison Cut-Easy, \$ doz. \$3.95
 Withington Acme, \$ doz. \$2.95; Bent, \$2.75; Adj. Serrated, \$2.20; Serrated, \$2.10; Yankee No. 1, \$1.50;
 Yankee No. 2, \$1.15.

Drain—

Standard List, 70¢@50¢
 Adjustable Handle, 25¢@33¢
 Brailley's, 35¢
 C. E. Jennings & Co. Nos. 45, 46, 40¢@10¢
 Jennings & Griffin, 60¢@25¢
 Swan's, 70¢@10¢
 Watrous, 30¢@10¢
 L. & J. White, 20¢@25¢
 Cantello's Folding, 50¢@50¢

Hay and Straw—

Blizzard, \$5.75@6.00
 Iwan's Sickle Edge, \$ doz. \$11.50
 Lightning, \$7.50

Mincing—

Buffalo, \$ gr. \$15.00
 Smith's, \$ doz. Single, \$2; Double, 45¢@50¢

Miscellaneous—

Farriers', doz. \$2.00@5.00
 Wostenholm's, \$ doz. \$3.00@3.25

Knobs—

Base, 2 1/2-inch, Birch, Rubber tip, \$1.55@1.40
 Carriage, Jap. all sizes, gro. 50¢@55¢
 Door, Mineral, doz. 60¢@70¢
 Door, Por. Jap d., doz. 75¢@80¢
 Door, Por. Nickel, doz. \$2.10@2.30
 Bardsley's Wood Door, Shutter, &c., 15¢
 Picture, Sargent's, 60¢@10¢
 Snow's Victor, 50¢@10¢

Ladders, Step—

Handy Ladder Works: Extended Shipped Shipped
 Length Length. Ready for K. D.
 Feet. Feet. Use. Per doz. Per doz.
 4, 16.00, 17.00
 5, 17.50, 18.00
 6, 19.00, 20.00
 7, 20.50, 21.00
 8, 22.00, 23.00
 9, 23.50, 24.00
 10, 25.00, 26.00
 11, 26.50, 27.00
 12, 28.00, 29.00

Shovels and Tongs—

Brass Head 60¢@60¢10¢
 Iron Head 60¢@60¢10¢

Sieves and Sifters—

Hunter's Imitation, gro. \$11.00@12.00
 Buffalo Metallo Blue, S. S. & Co., per gr.:
 14¢ 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
 Electric Light per gr. \$10.00
 Hunter's Genuine per gr. \$12.50
 Shaker (Barber's Pat.) Flour Sifters per doz. \$2.00

Sieves, Tin Rim—

Per dozen
 Inch 1 16 18 20
 Black full size \$0.95 98 1.00 1.10
 Plated, full size \$1.05 1.05 1.10 1.20
 Black, scant \$0.78 80 82

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
 Mesh 18, Nested, doz. \$0.75@0.80
 Mesh 20, Nested, doz. 85¢@.90
 Mesh 24, Nested, doz. 1.00@1.05

Sinks—

Cast Iron—
 Standard list 60¢@60¢10¢
 Note.—There is not entire uniformity in lists used by jobbers.

Wrought Steel—

Columbus Galv'd and Enamelled 60¢@5¢
 Columbus, Palated 45¢
 L. & G. Mfg. Co., Galvanized 50¢
 L. & G. Mfg. Co., Enamelled 50¢

Skeins, Wagon—

Cast Iron 70¢@10¢75¢
 Malleable Iron 60¢@10¢50¢
 Steel 40¢@40¢10¢

Slates—

"D" Slates 50¢@10¢50¢10¢10¢
 Unexcelled Noiseless Slates 60¢@5¢10¢10¢5¢
 Wire Bound 40¢@10¢50¢
 Double Slates, add \$1 case, net.

Slaw Cutters—See Cutters.**Slicers, Vegetable—**

Sterling \$2.00 33¢@5¢

Snaps, Harness—

German 40¢@40¢10¢
 Covert Mfg. Co.:
 Derby 35¢@2¢
 High Grade 45¢@2¢
 Jockey 40¢@2¢
 Trojan 45¢@2¢

Covert's Saddlery Works:

Banner 60¢@10¢
 Crown 60¢@10¢
 Triumph 60¢@10¢
 W. & E. T. Fitch Co.:
 Bristol 40¢@10¢
 Empire 50¢@5¢
 German 40¢
 National 60¢@5¢
 Perfect 50¢@5¢
 Champion 40¢
 Security 40¢
 Victor 60¢@5¢

Oneda Community:

Solid Steel 65¢@65¢10¢
 Solid Wire 65¢@65¢10¢10¢
 Bargent's Patent Guarded 60¢@10¢

Snaths—

Scythe 55¢@5¢

Snips, Tinnners—See Shears**Soldering Irons—**

See Irons, Soldering.

Spoke Trimmers—

See Trimmers, Spoke.

Spoons and Forks—

Silver Plated—
 Flat Ware 50¢@10¢60¢10¢
 Wm. Rogers Mfg. Co. 50¢@10¢

Miscellaneous—

German Silver 60¢@10¢
 Wm. Rogers Mfg. Co.:
 185 German Silver 60¢
 Rogers' Silver Metal 50¢@10¢

Springs—

Door—
 Gem (Coll.) 30¢
 Star (Coll.) 30¢
 Torrey's Rod, 39 in. \$1.10@1.25
 Warner's No. 2, per doz. \$2.50; No. 3, \$3.00
 Victor (Coll.) 50¢@10¢10¢

Carriage, Wagon, &c.

Factory Shipments.
 1 1/4 in and wider—Blk. Hf. Brt. Brt.
 Cliff's Bolster Springs 35¢
 Cliff's Seat Springs pair 55¢

Sprinklers, Lawn—

Enterprise 25¢@30¢
 Philadelphia No. 1, per doz. \$12; No. 2, \$15; No. 3, \$24

Squares—

Nickel plated List Jan. 5, 1900
 Steel and Iron 70¢@10¢
 Rosewood Hd. Try Square and T-Bevels 60¢@10¢10¢70¢
 Iron Hd. Try Squares and T-Bevels 40¢@10¢40¢10¢10¢
 Diaston's Try Sq. and T-Bevels 60¢@10¢
 Winterbottom's Try and Miter 50¢@10¢

Squeezer—

Lemon—
 Wood, Common, gro. No. 2, \$5.25
 \$5.50; No. 1, \$6.25@6.50
 Wood, Porcelain Lined Cheap \$1.00@1.75

Good Grade doz. \$3.00@5.50
 Tinned Iron doz. \$0.75@1.25
 Iron, Porcelain Lined doz. \$2.50@5.55
 Jennings' Star per doz. \$1.85@1.90
 King per doz. \$2.00

Staples—

Barbed Blind lb. 8¢@9¢
 Electricians', Association list, 7¢@10¢
 Fence Staples, same price as Barbed Wire. See Trade Report.
 Poultry Netting, Staples, per lb. 5¢
 Grand Crossing Tack Co.'s list, 8¢@10¢

Steels, Butchers—

Dick's 40¢
 Foster Bros' 30¢
 C. & A. Hoffmann's 40¢
 Nichols Bros 50¢

Steelyards—

25¢@25¢10¢

Stocks and Dies—

Blacksmiths' 60¢@10¢10¢
 Gardner Die Stocks No. 1 50¢
 Gardner Die Stocks, larger sizes 40¢
 Green River 25¢
 Lightning Screw Plate 35¢
 Little Giant 25¢
 Reese's New Screw Plates 25¢@30¢
 Curtis Reversible Ratchet Die Stock, 25¢

Stone—

Chicago Wheel & Mfg. Co.:
 Gem Corundum, 10 inch, \$10.80 per gr., 12 inch, \$12.00
 Cleveland Stone Co., list Nov. '92, 33¢@4¢
 Pike Mfg. Co., list '95-'96 33¢@4¢

Scythe Stones—

Chicago Wheel & Mfg. Co.:
 Corundum Oil, Double Grit 50¢
 Corundum Axe Stones, Slips, etc. 55¢
 Pike Mfg. Co.:
 Hindostan No. 1, per doz. 8¢
 Sand Stone 5¢
 Turkey Oil Stone, Extra 5 to 8 in. 33¢@10¢
 Turkey Slips \$1.50

Oil Stones, &c.

Chicago Wheel & Mfg. Co.:
 Corundum Oil, Double Grit 50¢
 Corundum Axe Stones, Slips, etc. 55¢
 Pike Mfg. Co.:
 Hindostan No. 1, per doz. 8¢
 Sand Stone 5¢
 Turkey Oil Stone, Extra 5 to 8 in. 33¢@10¢
 Turkey Slips \$1.50

Slip Stones, &c.

Chicago Wheel & Mfg. Co.:
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 Corundum Axe Stones, Slips, etc. 55¢
 Pike Mfg. Co.:
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Chesterman's 25¢@25¢5¢
 Eddy's Steel 40¢@40¢5¢
 Eddy's Metallic 33¢@33¢5¢
 Eddy's Steel and Metallic 35¢
 Eddy's Steel 33¢@33¢5¢
 Eddy's Steel 33¢@33¢5¢
 Eddy's Steel 33¢@33¢5¢

Thermometers—

Tin Case 80¢@90¢10¢

Ties, Bale—Steel.

Standard Wire 50¢@10¢5¢

Ties, Wall—

Cleveland Wire Spring Co.:
 Galv. Steel 5 3/2 x 8 1/4 in. # 1000, \$10.00
 Galv. Steel 5 3/2 x 8 1/4 in. # 1000, \$11.00
 Galv. Steel 5 3/2 x 11 1/4 in. # 1000, \$12.00
 Galv. Steel 5 3/2 x 15 1/4 in. # 1000, \$14.00

Tinnners' Shears, &c.—

See Shears, Tinnners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.—See Benders and Upsetters, Tire**Tobacco Cutters—**

See Cutters, Tobacco.

Tools—

Coopers'—
 L. & I. J. White 20¢@20¢5¢

Saw—

Atkins' new list 40¢
 Simonds' Improved 33¢@5¢
 Simonds' Crescent 25¢

Ship—

L. & I. J. White 25¢

Transom Lifters—

See Lifters, Transom.

Traps—Game—

Oneida Pattern 70¢@10¢75¢10¢
 Newhouse 45¢@50¢
 Hawley & Norton 85¢@5¢70¢
 Victor (Oneida Pattern) 75¢@75¢10¢
 Star (Blake Pattern) 65¢@10¢70¢5¢

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 9¢@9¢1/2¢
 Mouse, Round or Square Wire doz. \$0.85@1.00
 Diamond Joe Mouse Traps, per doz. \$1.00
 Marty French Rat and Mouse Traps (Genuine):
 No. 1, Rat, Each \$1.12 1/2; per doz. \$12.00
 No. 3, Rat, per doz. \$6.00; case of 50 \$5.25 doz.
 No. 3, Rat, per doz. \$1.75; case of 72 \$4.25 doz.
 No. 4, Mouse, per doz. \$3.50; case of 72 \$4.25 doz.
 No. 5, Mouse, per doz. \$2.75; case of 72 \$2.25
 Schuyler's Rat Killer, No. 1, per gr. \$30.00; No. 2, per gr. \$30.00; Mouse, No. 3, \$15.00

Fly—

Balloon, Globe or Acme doz. \$1.15@1.25; gro. \$12.00@14.00
 Harper, Champion or Paragon doz. \$1.25@1.40; gro. \$15.50@15.00

Trimmers, Spoke—

Bonney's Nos. 1 and 2 40¢
 Stearns 25¢

Trowels—

Diaston Brick and Pointing 30¢
 Diaston Plastering 25¢
 Diaston "Standard Brand" and Galvan Trowels 40¢
 Never-Break Steel Garden Trowels gro. \$7.00
 Peace's Plastering 30¢
 Rose Brick and Plastering 25¢@5¢
 Woodrough & McParlin, Plastering, 25¢@10¢

Trucks, Warehouse, &c.—

R. & L. Block Co.'s list 40¢
 Daisy Stove Trucks, improved pattern per doz. \$21.00
 Model Stove Trucks per doz. \$18.50

Tubs, Wash—

No. 1 2 3
 Galvanized, per doz. \$5.00 5.50 6.00
 Galvanized Wash Tubs (S. S. & Co.):
 No. 1 2 3 10 20 30
 Per doz \$5.25 6.00 6.75 6.50 7.25 8.00

Twine—

Miscellaneous—
 No. 2, 3, 4 and 1/2-lb. Balls, 25¢ 26¢
 No. 12, 1/4 and 1/2-lb. Balls, 18¢ 21¢
 No. 15, 1/4 and 1/2-lb. Balls, 16¢ 19¢
 No. 24, 1/4 and 1/2-lb. Balls, 15¢ 18¢
 No. 36, 1/4 and 1/2-lb. Balls, 15¢ 18¢
 Chalk Line, Cotton, 1/4-lb. Balls 25¢@24¢
 Cotton Lops, 6, 9, 12 and 15 lb., to doz 7¢@8¢
 Cotton Wrapping, 5 Balls to lb 10¢@10¢
 American 2-Ply Hemp, 1/4 and 1/2-lb. Balls 12¢@15¢
 American 3-Ply Hemp, 1-lb. Balls 12¢@15¢
 India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Twine) 10¢
 India 3-Ply Hemp, 1-lb. Balls 10¢

India 3-Ply Hemp, 1/4-lb. Balls 10¢
 2, 3, 4 and 5-Ply Jute, 1/4-lb. Balls 10¢

Mason Line, Linen, 1/4-lb. Balls 10¢
 No. 26 Mattress, 1/4 and 1/2-lb. Balls 10¢
 Wool 10¢

Vises—

Solid Box 40¢@10¢
 Bonney's Saw Vises 40¢@10¢

Parallel—

Athol Machine Co.:
 Simpson's Adjustable 40¢
 Standard 40¢
 Amateur 40¢
 Bonney's 40¢
 Fisher & Norris Double Screw 15¢@10¢
 Hollands' 40¢
 Machinists' 40¢
 Key-tone 40¢
 Lewis Tool Co. 40¢
 Massey's Perfect 40¢
 Massey's Clincher 40¢
 Merrill's 40¢
 Miller's Falls 40¢
 Parker's 40¢
 Victor 40¢
 Regulars 40¢
 Vulcan's 40¢
 Combination Pipe 40¢
 Prentiss's 40¢
 Sargent's 40¢
 Simpson's Adjustable 40¢
 Snediker's X. L. 40¢
 Stephens' 40¢
 Toles' Woodworking 40¢
 Van, W. & W. Haw. Co. 40¢

Saw Filers—

Bonney's No. 1, \$13; No. 3, \$16 50¢@10¢
 Dist n's D 3 Clamp and Guide, per doz. \$30.00
 Reading 40¢
 Wentworth's Rubber Jaw, Nos. 1, 2 and 3 40¢

Miscellaneous—

Signal & Keeler Combination Pipe Vise 5¢
 Parker's Combination Pipe: 47 Series 40¢
 187 Series 60¢@10¢
 No. 870 40¢

Wads—Price Per M.

R. E., 11 up 60¢
 R. E., 9 and 10 70¢
 B. E., 8 80¢
 B. E., 7 80¢
 P. E., 11 up 1.00
 P. E., 9

Washers—	
Leather, Axle—	
Solid.....	80¢10¢10¢85¢
Patent.....	85¢85¢85¢
Coil: 1/4 1 1 1/4 1 1/2	
11c 12c 13c 15c per 100	
Iron or Steel—	
Size bolt ... 5-16 3/4 1/2 5/8 3/4	
Washers.....	\$5.60 4.70 3.0 3.30 3.00
In lots less than one keg add 1/4c per	
lb., 5-lb. boxes add 1/4c to list.	
Cast washers—	
Over 1/2 inch, barrel lots.....	per lb., 2c
Washer Cutters—	
See Cutters, Washer.	
Washing Machines—	
See Machines, Washing.	
Water Coolers—	
See Coolers, Water.	
Weaners—	
Tyler's New Hater—No. 1 7 doz.	\$3.45
No. 2, \$3.70; No. 3, \$4.10; No. 4, \$4.50	
Tyler's Saver—Nos. 1 and 2, 7 doz.	\$1.70
No. 3, \$2.00; No. 4, \$2.30.	
Wedges—	
Oil Finish.....	lb. 5 1/4c
Aze Finish.....	lb. 1c

Weights, Sash—	
Eastern prices.....	\$25.00
Western prices.....	\$18.00@19.00
NOTE.—There is a wide difference in	
prices East and West, and some foundries	
are naming lower prices than the	
above	
Well Buckets, Galvanized	
See Pails, Galvanized.	
Wheels Well—	
8-in., \$1.65@1.75; 10-in., \$2.00@2.10;	
12-in., \$2.50@2.75; 14-in., \$3.25@3.50	
Wire and Wire Goods—	
Brt. and Ann., 6 to 9.....	70¢10¢
Brt. and Ann., 10 to 18.....	72¢10¢
Brt. and Ann., 19 to 26.....	75¢10¢
Brt. and Ann., 27 to 36.....	75¢10¢
Cop'd and Galv., 6 to 9.....	60¢10¢
Cop'd and Galv., 10 to 18.....	70¢
Cop'd and Galv., 19 to 26.....	70¢10¢
Cop'd and Galv., 27 to 36.....	72¢10¢
Tinned, 6 to 14.....	70¢10¢
Tinned, 15 to 18.....	70¢10¢
Tinned, 19 to 26.....	70¢
Tinned, 27 to 36.....	75¢10¢
Annealed Wire on Spools.....	70¢50¢
Brass and Copper Wire on Spools.....	
60¢50¢@70¢10¢	
Brass, list Feb. 25, '96.....	
30¢	

Copper, list Feb. 25, '96.....	15¢
Cast Steel Wire.....	50¢
Stub's Steel Wire.....	\$6.00 to \$2.40¢
Wire Clothes Line, see Lines.	
Wire Picture Cord, see Cord.	
Bright Wire Goods—	
Iron and Brass, list July 1, 1899.....	85¢10¢@85¢10¢10¢
Wire Cloth and Netting—	
Galvanized Wire Netting.....	10¢5¢2¢
Painted Screen Cloth per 10 ft.....	
Hardware Grade, Iron:	
2 to 20 mesh.....	sq. ft. 2 1/2¢@3c
20 x 20 mesh.....	sq. ft. 3¢@3 1/2c
Galv. Hardware Grade, 2 to 5 mesh.....	sq. ft. 3 1/2¢@3 1/4c
Galv. Hardware Grade, 6 to 8 mesh.....	sq. ft. 4¢@4 1/4c
Wire Barb—See Trade Report.	
Wire, Rope—See Rope, Wire.	
Wrenches—	
Agricultural.....	70¢10¢@75¢
Case lots.....	75¢10¢
Baxter's S.....	80¢10¢
Cosco's Machine.....	40¢10¢@55¢
Allen's Po. Kot (Bright).....	50¢0¢
Alligator.....	60¢10¢10¢

Bent's & Call's:	
Adjustable S. Pipe.....	35¢5¢
Brigg's Pattern.....	30¢10¢
Combination Black.....	40¢5¢
Combination Bright.....	40¢
Cylinder or Gas Pipe.....	55¢
Extra Heavy.....	45¢
Merrick's Pattern.....	50¢
No. 3 Pipe, Bright.....	30¢
Pindley Automatic.....	30¢
Boar-Innan's.....	30¢
Bull Doz. W. & B.....	60¢10¢10¢
Donohue's Engineer.....	40¢10¢
Fairlie.....	50¢10¢
Hercules.....	70¢
Solid Handles, P. S. & W.....	50¢10¢
Stevenson.....	60¢10¢10¢
Wrought Goods—	
Stanley, Hooks, &c., list March 17	
'92.....	85¢10¢@85¢10¢
Yokes, Neck—	
Covert Saddlery Works, Trimme 1.60&5	
Covert Saddlery Works, Neck Yoke	
Centers.....	70¢
Yokes, Ox, and Ox Bows—	
Fort Madison's Farmers & Freighters.....	list net
Zinc—	
Sheet.....	lb. 6 1/4¢@7c

PAINTS, OILS AND COLORS.—Wholesale Prices.

White Lead, Zinc, &c.	
Lead, Foreign white, in Oil.....	7 1/4¢ 9 1/4¢
Lead, American White, in Oil:	
Lots of 500 lb or over.....	@ 6 1/4¢
Lots less than 500 lb.....	@ 6 1/2¢
Lead, White, in oil, 25 lb tin	
pails, add to keg price.....	@ 1 1/4¢
Lead, White, in oil, 12 1/2 lb tin	
pails, add to keg price.....	@ 1
Lead, White, in oil, 1 to 5 lb as-	
sorted tins, add to keg price.....	@ 1 1/4¢
Lead White, Dry in bbls.....	@ 5 1/4¢
Lead, American, Terms: On lots of 500	
lbs. and over, 60 days, or 25 for cash if	
paid in 15 days from date of invoice.	
Zinc, American, dry.....	@ 4 1/4¢@4 1/2¢
Zinc, Paris, Red Seal, dry.....	@ 8 1/4¢
Zinc, Paris, Green Seal, dry.....	@ 9 1/4¢
Zinc, Antwerp, Red Seal, dry.....	@ 7 1/4¢
Zinc, Antwerp, Green Seal, dry.....	@ 8 1/4¢
Zinc, V. M. French, in Poppy Oil,	
Green Seal:	
Lots of 1 ton and over.....	@ 12 1/4¢
Lots of less than 1 ton.....	@ 12 1/2¢@12 3/4¢
Zinc, V. M. French, in Poppy Oil,	
Red Seal:	
Lots of 1 ton and over.....	@ 10 1/4¢@11 1/4¢
Lots of less than 1 ton.....	@ 11 1/2¢@12 1/4¢
Discounts.—V. M. French Zinc.—Dis-	
counts to buyers of 10 bbls, lots of one or	
assorted grades, 1%: 25 bbls, 2%: 50	
bbls, 4%.	
Dry Colors.	
Black, Carbon.....	@ 8 @20
Black, Drop, Amer.....	2 1/2¢@4
Black, Drop, Eng.....	7 @11
Black, Ivory.....	15 @21
Lamp, Com.....	3 @5
Blue, Celestial.....	3 1/2¢@5
Blue, Chinese.....	35 @40
Blue, Prussian.....	30 @38
Blue, Ultramarine.....	3 @35
Brown, Spanish.....	1 1/2¢@1
Brown, Vandyke, Amer.....	1 1/4¢@2 1/4
Brown, Vandyke, Foreign.....	2 1/4¢@3 1/4
Carmine, No. 40.....	@ 2.15¢@2.75
Green, Chrome, ordinary.....	5 @6

Green, Chrome, pure.....	18 @20
Lead, Red, bbls. 1/2 bbls. and keg:	
Lots 500 lb or over.....	@ 6 1/4¢
Lots less than 500 lb.....	@ 6 1/2¢
Litharge, bbls. 1/2 bbls. and keg:	
Lots 500 lb or over.....	@ 6 1/4¢
Lots less than 500 lb.....	@ 6 1/2¢
Ocher, French Wash.....	1 1/4¢@2
Ocher, Dutch Wash.....	4 1/4¢@5
Ocher, American.....	@ 10.00@15.00
Orange Mineral, English.....	@ 8 @11 1/2
Orange Mineral, German.....	8 1/4¢@8 1/2
Orange Mineral, American.....	8 1/4¢@8 1/2
Red, Indian, English.....	4 1/4¢@8 1/2
Red, Indian, American.....	3 @3 1/4
Red, Turkey, English.....	4 @6
Red, Tuscan, English.....	7 @10
Red, Venetian, Amer.....	@ 100 lb. 80¢@1.10
Red, Venetian, English.....	@ 1.80@2.10
Sienna, Italian, Burnt and	
Powdered.....	@ 3 1/4¢@9 1/4
Sienna, Ital., Raw, Powd.....	3 @7 1/2
Sienna, American, Raw.....	1 1/2¢@2
Sienna, American, Burnt and	
Powdered.....	@ 1 1/4¢@2
Talc, French.....	@ 100 lb \$1.25 @6.00
Talc, American.....	.90 @6.10
Terra Alba, French, @ 100 lb.....	.95 @1.00
Terra Alba, English.....	.95 @1.00
Terra Alba, American No. 1.....	.95 @70
Terra Alba, American No. 2.....	.45 @50
Umber, Turkey, Bat. & Pow.....	2 1/4¢@3 1/4
Umber, Turkey, Raw & Powd.....	2 1/4¢@3 1/4
Umber, Bat. Amer.....	1 1/4¢@2
Umber, Raw, Amer.....	1 1/4¢@2
Yellow, Chrome.....	10¢@25
Vermilion, American Lead.....	10 @23
Vermilion, Quicksilver, bulk.....	@ 72
Vermilion, Quicksilver, bags.....	@ 73
Vermilion, English, Import.....	.80 @95
Vermilion, Chinese.....	.88 @93
Colors in Oil.	
Black, Lampblack.....	10 @14
Black, Chinese.....	36 @44
Blue, Prussian.....	32 @43
Blue, Ultramarine.....	12 @16

Brown, Vandyke.....	9 1/4¢@13
Green, Chrome.....	8 @12
Green, Paris.....	@ 21
Sienna, Raw.....	10 @13
Sienna, Burnt.....	10 @13
Umber, Raw.....	9 1/4¢@12
Umber, Burnt.....	9 1/4¢@12
Miscellaneous.	
Barytes, Foreign, @ ton.....	\$18.00@21.00
Barytes, Amer. doate.....	19.00@20.00
Barytes, Crude.....	9.00@10.00
Chalk, in bulk.....	@ 100 lb 2.60@2.75
China Clay, English.....	@ 100 lb 12.00@17.50
Cobalt, Oxide.....	@ 100 lb 2.25@2.50
Whiting, common.....	@ 100 lb .42¢@.52
Whiting, Gilders.....	.54¢@.64
Whiting, extra Gilders.....	.55¢@.68
Putty.	
In bbls.....	\$1.00
In hds.....	2.40
In cans, 12 lb to 25 lb.....	2.50
In cans, 1 lb to 5 lb.....	3.60
Spirits Turpentine.	
In Southern bbls.....	@ 43 1/2¢
In machine bbls.....	@ 44 ¢
Glue.	
Low Grade.....	@ 12 @15 1/2
Cabinet.....	13 1/4¢@16 1/4
Medium White.....	14 1/4¢@16 1/4
Extra White.....	18 @23
French.....	12 @40
Irish.....	13 1/4¢@16
Animal, Fish and Vegetable Oils.	
Linseed, City, raw.....	@ gal. 75¢@76

Linseed, City, boiled.....	77 @78
Linseed, State of West'n, raw.....	@ 73
Linseed, raw Calcutta see.....	@ 25
Lard, Prims.....	@ 10
Lard, Extra No. 1.....	@ 17
Lard, No. 1.....	@ 14
Cotton-seed, Crude.....	@ 32
Cotton-seed, Summer Yellow.....	@ 35 1/2
Cotton-seed, Summer Yellow.....	@ 33 1/2
off grades.....	@ 33 1/2
Sperm, Crude.....	@ 33 1/2
Sperm, Natural Spring.....	@ 34
Sperm, Bleached Spring.....	@ 34
Sperm, Natural Winter.....	@ 37
Sperm, Bleached Winter.....	@ 37
Whale, Crude.....	@ 17
Whale, Natural Winter.....	@ 17
Whale, Bleached Winter.....	@ 19
Menhaden, Crude, South.....	@ 26
Menhaden, Light Strain.....	@ 29
Menhaden, Bleached Winter.....	@ 35
Menhaden, Ex Bleached Winter.....	@ 37
Tallow, prime.....	@ 51 @52
Cocoonut, Ceylon.....	5 1/2¢@5 1/4
Cocoonut, Ceylon.....	5 1/2¢@5 1/4
Cod, Domestic.....	31 @33
Cod, Newfoundland.....	38 @37
Red Elaine.....	39 @3
Red Saponified.....	@ 5 47¢@5
Olive, Italian, bbls.....	57 @63
Neatsfoot, prime.....	48 @51
Palm, prime, Lagos.....	@ 54 @54
Mineral Oils.	
Black, 20 gravity, 25@30 cold	
test.....	@ gal. 91¢@10 1/4
Black, 20 gravity, 15 cold test.....	10 1/4¢@11 1/4
Black, sun w.....	9 1/4¢@9 1/2
Cylinder, light filtered.....	14 1/4¢@17 1/4
Cylinder, dark filtered.....	11 1/4¢@15 1/4
Paraffine, 903-907 gravity.....	14 1/4¢@15 1/4
Paraffine, 903 gravity.....	13 1/4¢@14 1/4
Paraffine, 883 gravity.....	12 1/4¢@13 1/4
Paraffine, red, No. 1.....	14 1/4¢@15 1/4
In small lots 1/2¢ advance.	

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Regular Edition, Issued every THURSDAY morning,		\$5.00 a year
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CURRENT METAL PRICES.

NOVEMBER 7, 1900.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ per lb.; Square, 0.8¢ per lb.	
1 to 1 1/2 in. round and square	1.70@1.80¢
1 1/2 to 4 in. x 3/4 to 1 in.	1.90@2.00¢
4 to 12 in. x 1 1/4 to 1 1/2 in.	2.10@2.20¢
Refined Iron:	
1 to 1 1/2 in. round and square	2.00¢
1 1/2 to 4 in. x 3/4 to 1 in.	2.10¢
4 to 12 in. x 1 1/4 to 1 1/2 in.	2.20¢
Rods—3/4 and 1-1/2 round and square	2.10¢
Angles:	
3 in. x 3/4 in. and larger	2.00¢
3 to 3 1/2 in. x 3/4 in.	2.10¢
1 1/2 to 2 1/2 in. x 3/4 in.	2.00¢
1 1/2 to 2 1/2 in. x 3/4 in. and thicker	2.10¢
1 to 1 1/2 in. x 3/4 in.	2.20¢
1 to 1 1/2 in. x 3/4 in.	2.50¢
3/4 x 3/4 in.	2.50¢
3/4 x 3/4 in.	2.50¢
1/2 x 3/4 in.	3.70¢
Teas:	
1 in.	2.40¢
1 1/2 in.	2.30¢
1 1/2 in. and larger	2.20¢
Beams:	
Channel, 3 in. and larger	2.20¢
Bands—1/2 to 3/4 x 3-1/2 to No. 8	2.10¢
"Burden's Best" Iron, base price	8.15¢
Burden's "H. B. & S. Iron, base price	2.95¢
"Clister"	3.80¢
Norway Bars	4.40¢
Norway Shapes	4.40¢

Merchant Steel from Store—

Bessemer Machinery	1.70 to 1.80¢
Toe Calk, Tire and Sleigh Shoe	2.00@2.50¢
Best Cast Steel, base price in small lots	7 1/2¢
Best Cast Steel Machinery, base price in small lots	6¢

Soft Steel Sheets—

1/2 in.	1.85¢	No. 14	2.40¢
3-16 in.	1.90¢	No. 16	2.50¢
No. 8	2.10¢	No. 18	2.80¢
No. 10	2.20¢	No. 20	3.20¢
No. 12	2.30¢	No. 22	3.50¢

Sheet Iron from Store.

Black.

	Common	R. G. Cleaned
Nos. 14 to 16	2.20¢	3.10¢
Nos. 18 to 20	2.30¢	3.20¢
Nos. 22 to 24	2.40¢	3.30¢
Nos. 26 to 28	2.50¢	3.40¢
Nos. 30 to 32	2.60¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment	10 1/2¢
Patent Planished	10 1/2¢; 10 3/4¢; 11¢, net.

Galvanized.

	B. B.
Nos. 10 to 16	13 1/2¢
Nos. 17 to 21	14 1/2¢
Nos. 22 to 24	15 1/2¢
Nos. 25 to 28	16 1/2¢
No. 27	16 1/2¢
No. 28	17 1/2¢
No. 29	18 1/2¢
No. 30	19 1/2¢
30 in. 1 1/2 in. high	21 1/2¢

Foreign Steel from Store—

Best Cast	15¢
Extra Cast	15 1/2¢
Swaged Cast	16¢
Best Double Shear	15¢
Bilster, 1st quality	19¢
German Steel, Best	10¢
2d quality	9¢
3d quality	8¢
Sheet Cast Steel, 1st quality	14¢
2d quality	12¢
3d quality	12¢
R. Mushet's "Special"	46¢
"Titanium" Annealed	75¢
Hobson's Choice XX Extra Best	10¢
Hessop Self Hardening	45¢
Beamons "Nelson" Steel	40¢
Hobson's "Soho" Special Self-Hardening	43¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per lb.
Banca, Pigs	30 1/2¢
Straits, Pigs	30 1/2¢
Straits in Bars	30 1/2¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC, 14 x 20	7.50
IX, 14 x 20	9.00
Melyn Grade:	
IC, 14 x 20	7.00
IX, 14 x 20	8.50
Allaway Grade:	
IC, 14 x 20	6.15
IX, 14 x 20	7.25

American Coke Plates—Bessemer—

IC, 14 x 20	108¢
IX, 14 x 20	108¢
IXX, 14 x 20	108¢

American Terne Plates—

IC, 20 x 28	10.50
IX, 20 x 28	12.50

Tin Boiler Plates, American—

IXX, 14 x 20	112 sheets	\$13.00
IXX, 14 x 20	112 sheets	14.00
IXX, 14 x 31	112 sheets	15.50

Copper—

Duty: Pig, Bar and Ingot and Old Copper free	
Manufactured, 2 1/2¢ per lb.	

Ingot—

Lake	17 1/2¢
Ansonia grade Casting	17 1/2¢

Sheet and Bolt—

January 19, 1900.

Net.

Prices, in cents per pound.
Sheet 30 x 60.

	Not wider than		Not longer than		And longer than		64 oz. & over, 50 lb. sheet, 30 x 60 and heavier.		30 oz. to 64 oz. 25 to 50 lb.		24 oz. to 32 oz. 18 1/2 to 25 lb.		16 oz. to 24 oz. 12 1/2 to 18 1/2 lb.		14 oz. and 15 oz. 11 to 12 1/2 lb.		12 oz. and 13 oz. 9 1/2 to 11 lb.		10 oz. and 11 oz. 7 1/2 to 9 1/2 lb.		8 oz. and 9 oz. 6 1/2 to 7 1/2 lb.		Lighter than 8 oz.		
Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
30	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600	624	
36	84	108	132	156	180	204	228	252	276	300	324	348	372	396	420	444	468	492	516	540	564	588	612	636	
42	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600	624	648	
48	108	132	156	180	204	228	252	276	300	324	348	372	396	420	444	468	492	516	540	564	588	612	636	660	
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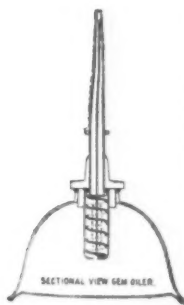
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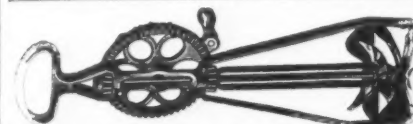
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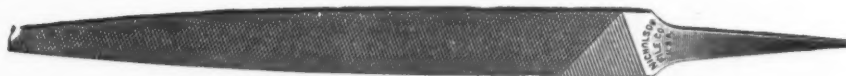
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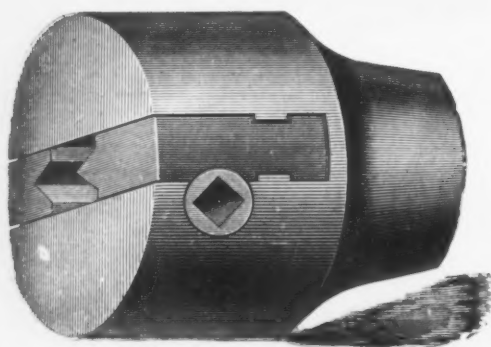
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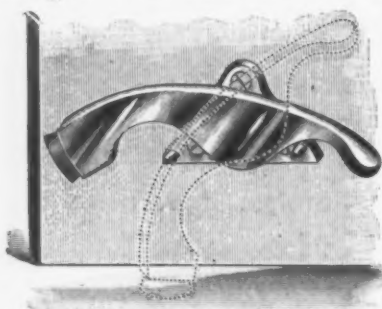
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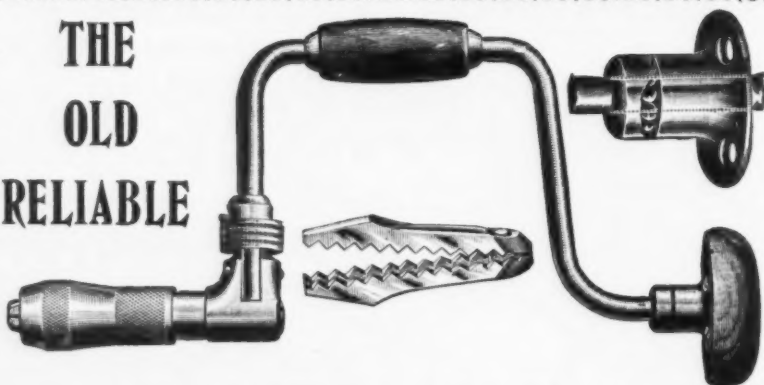


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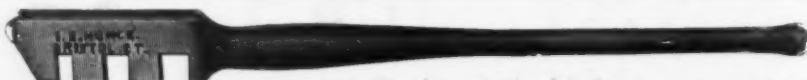
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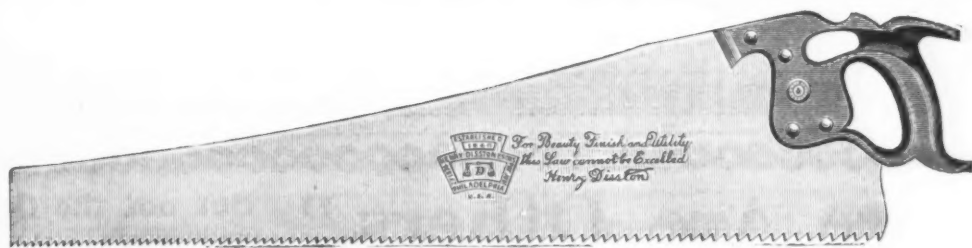
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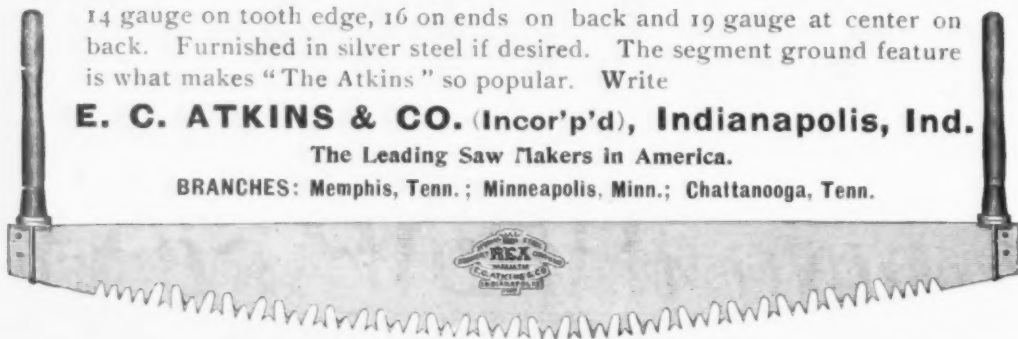
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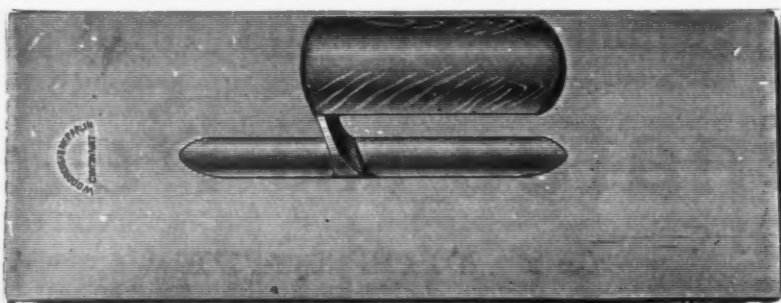
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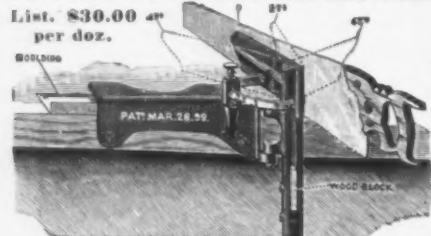


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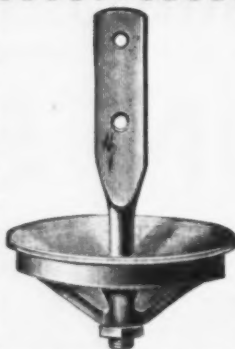
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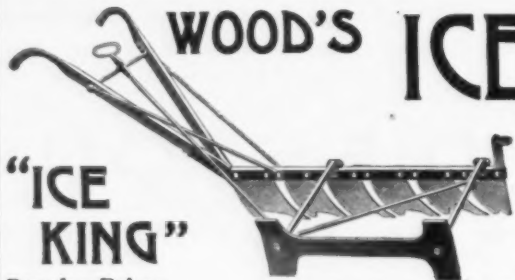
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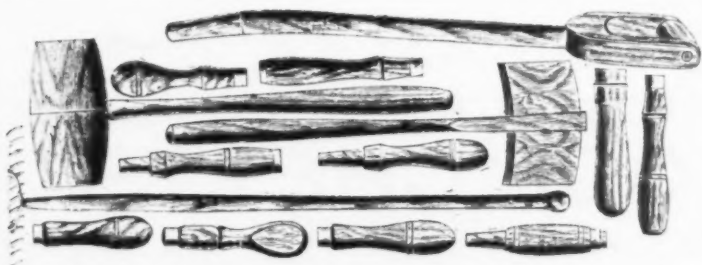
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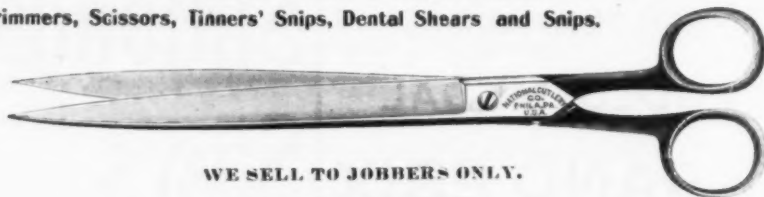
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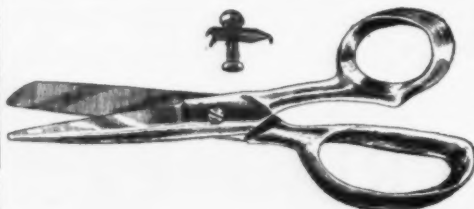
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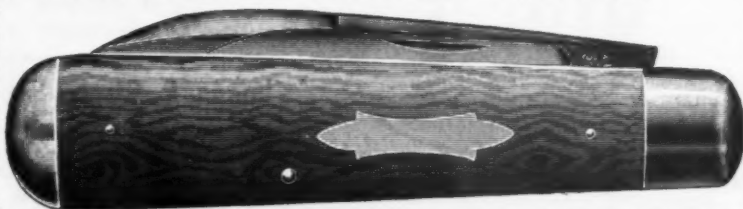
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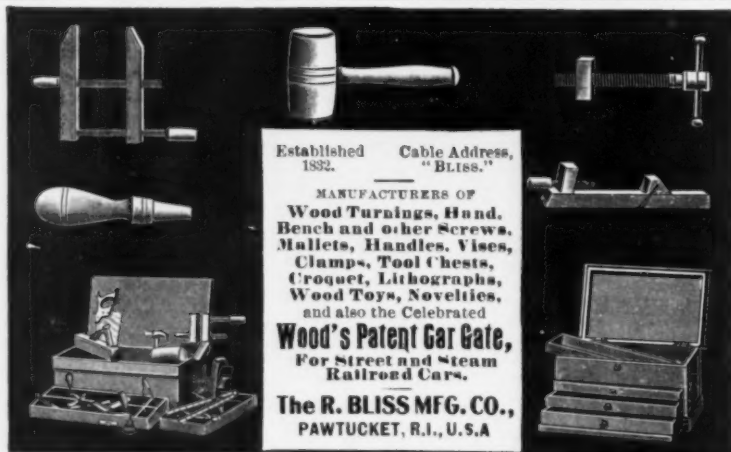
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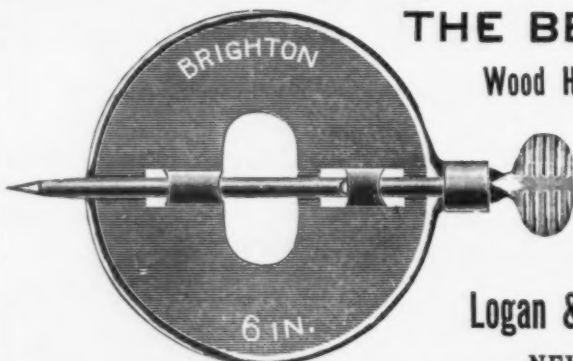
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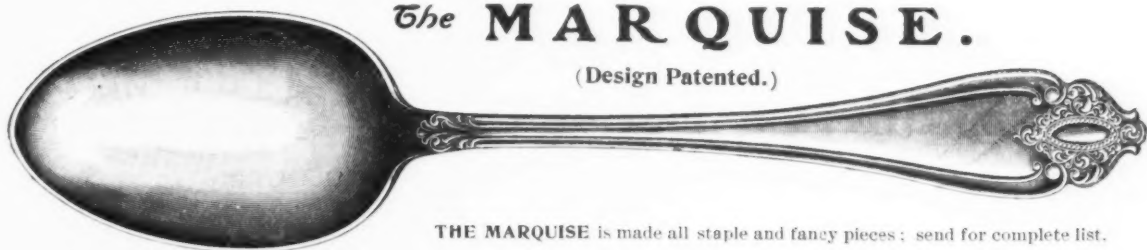
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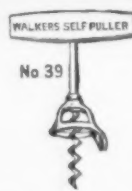
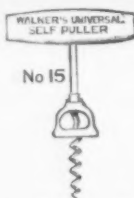
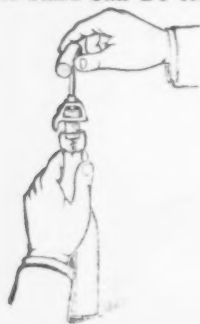
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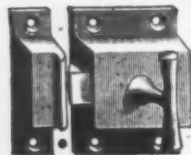
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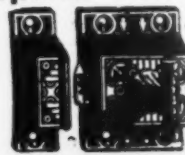
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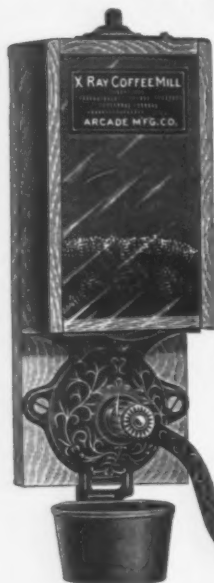
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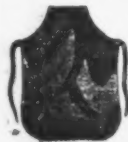
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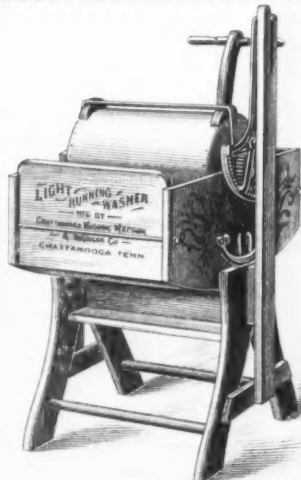
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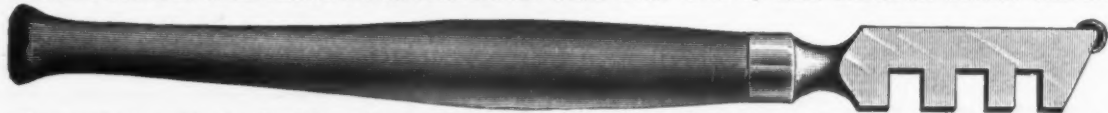
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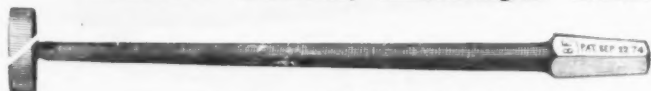
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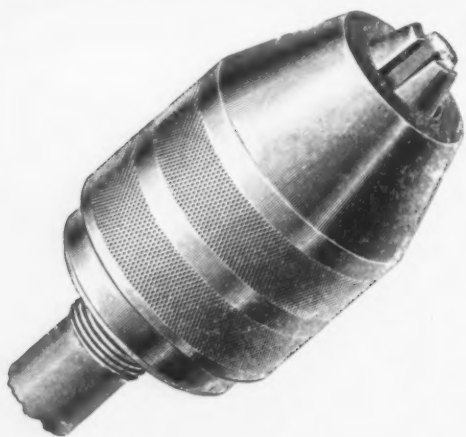
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BALL BEARING STAND. MARQUETRY WOOD WORK.

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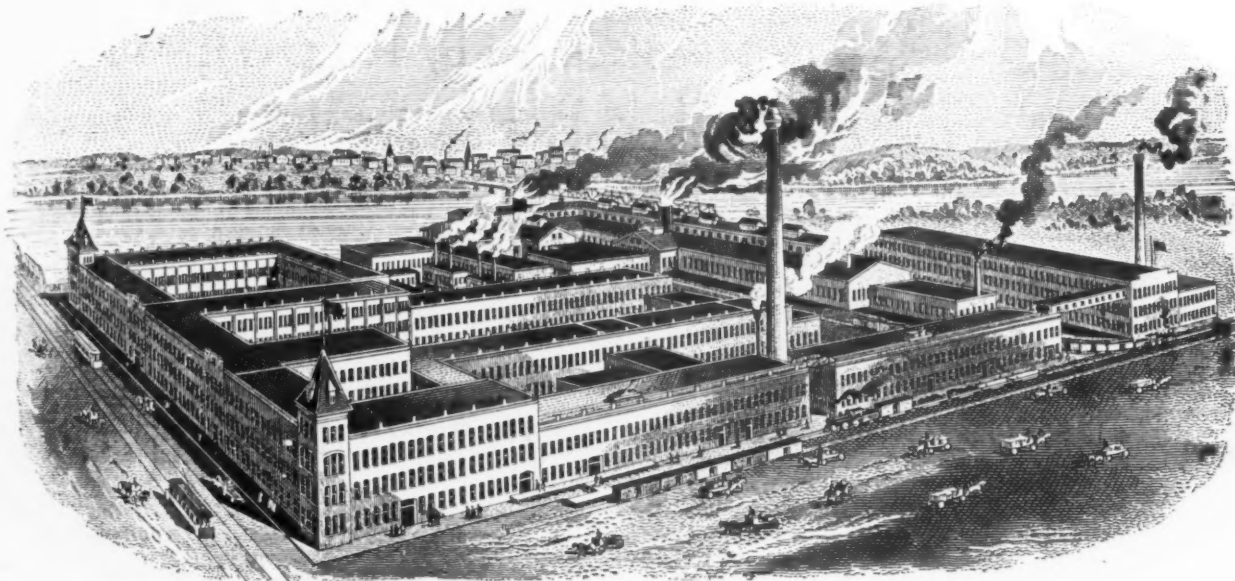
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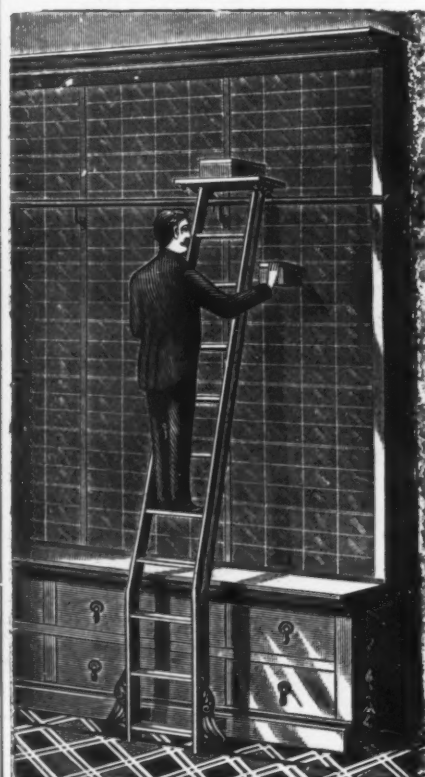
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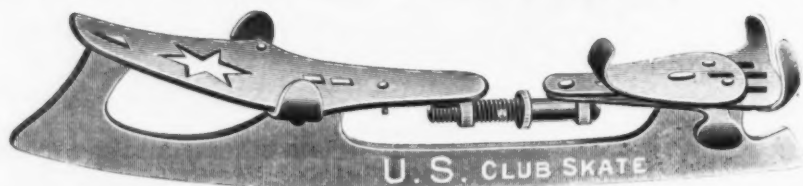
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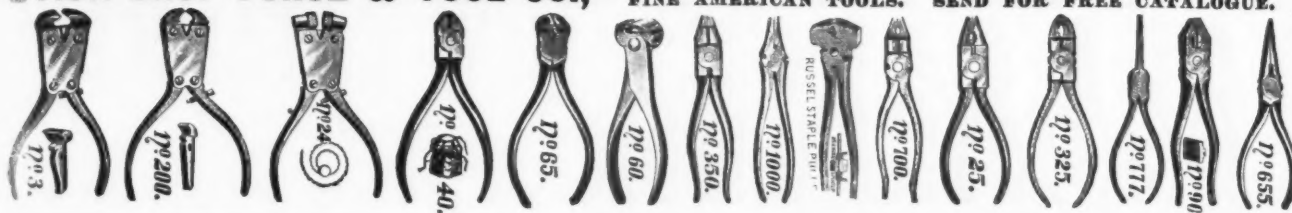
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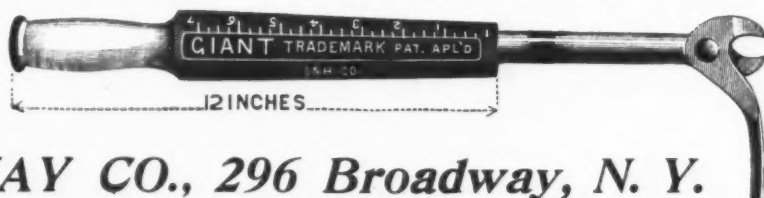
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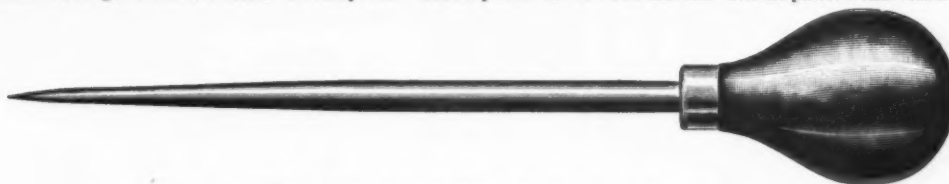
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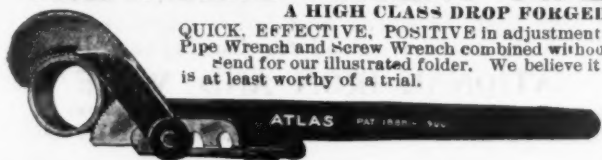
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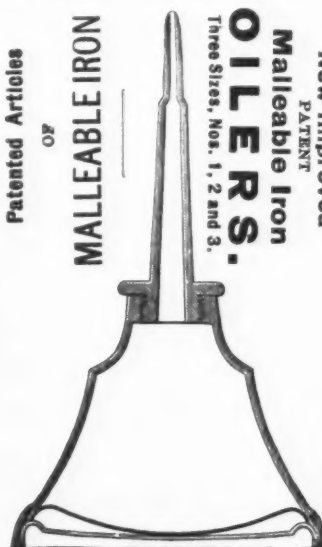
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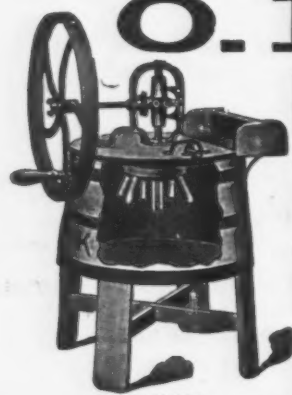


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Weldless Rings.
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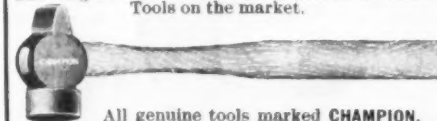
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Our steel is made expressly and solely for us. Dies forged under our system will cut 10 to 25% more blanks than others before regrinding.

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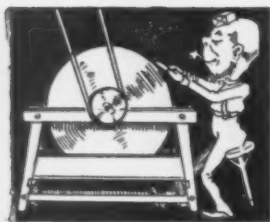
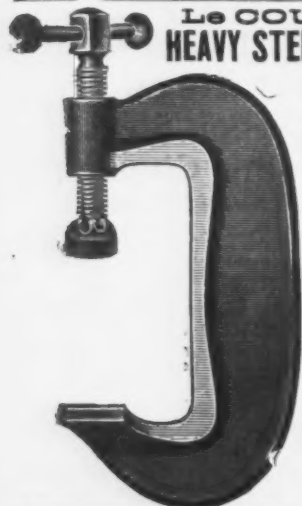


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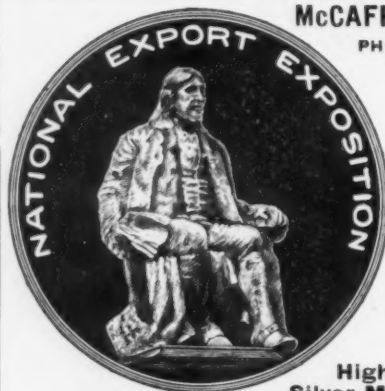
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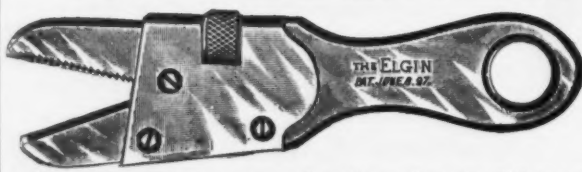
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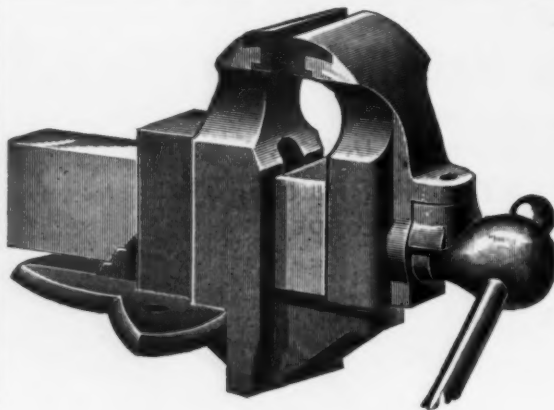
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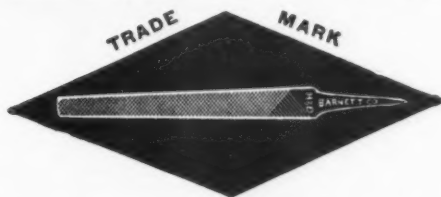
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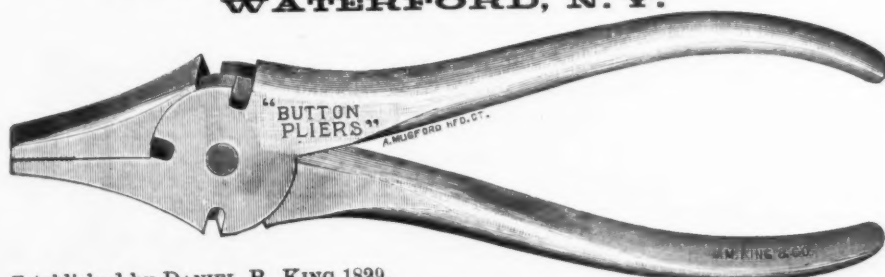
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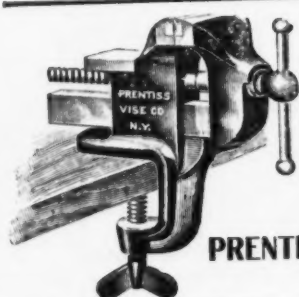
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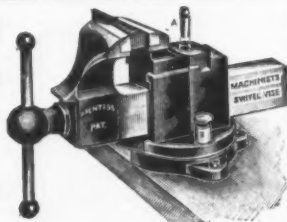


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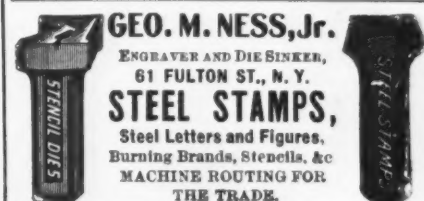
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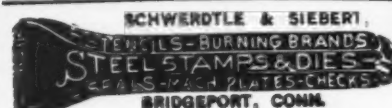


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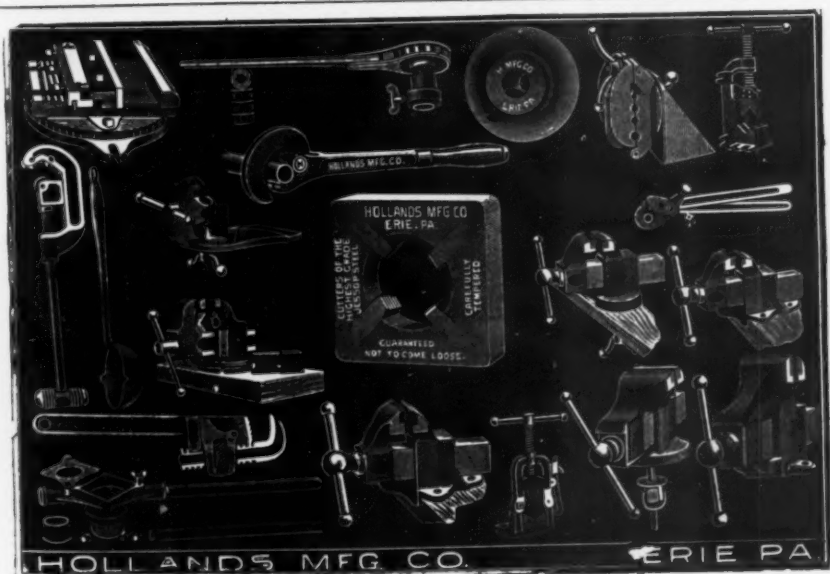


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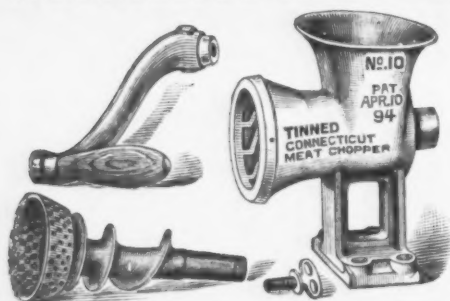
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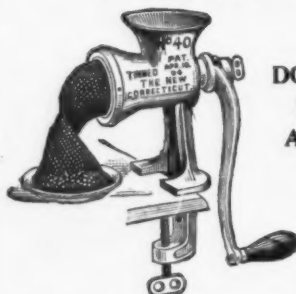
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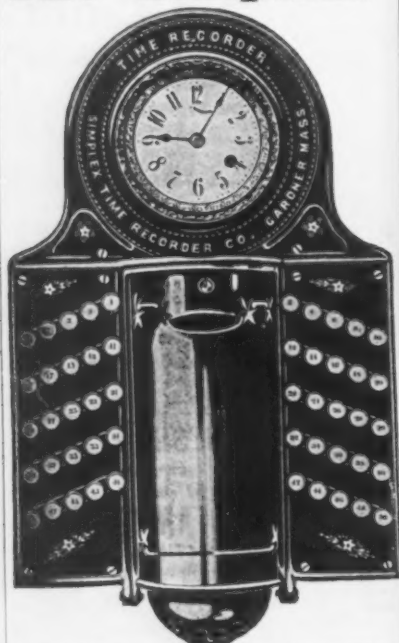


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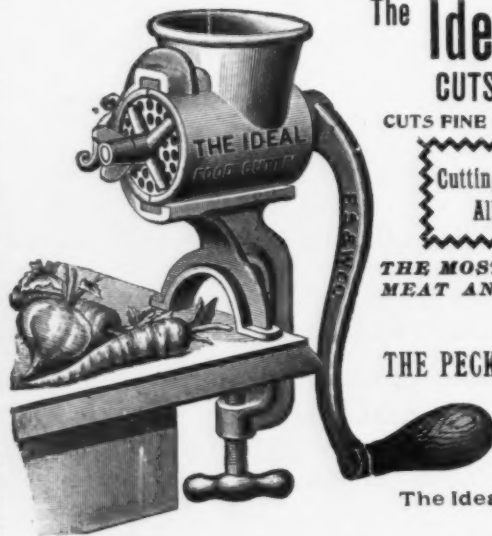
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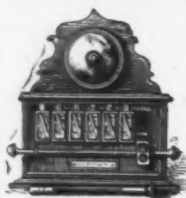
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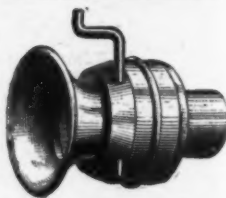
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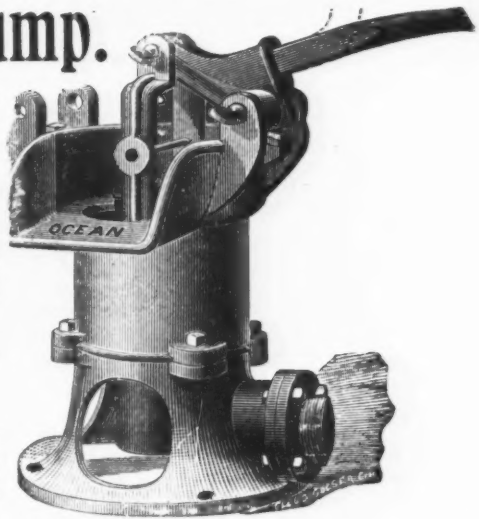
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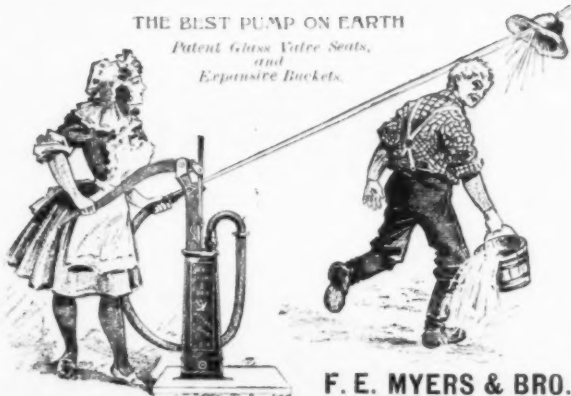
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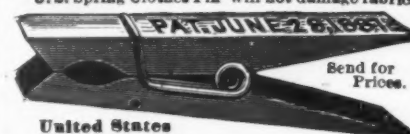
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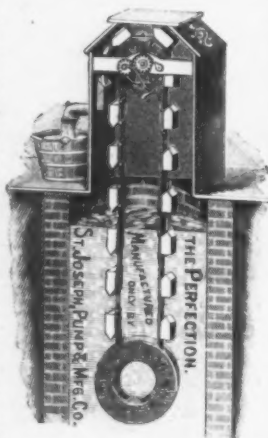
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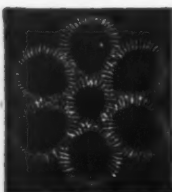
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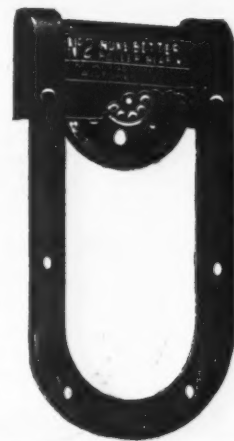


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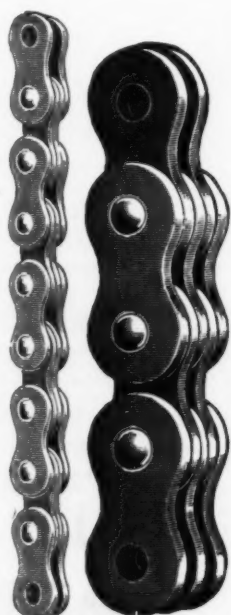
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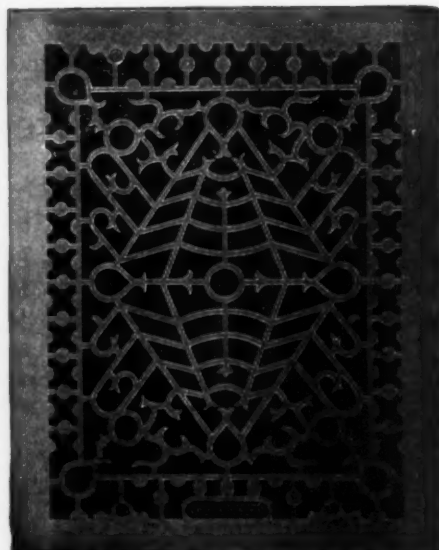
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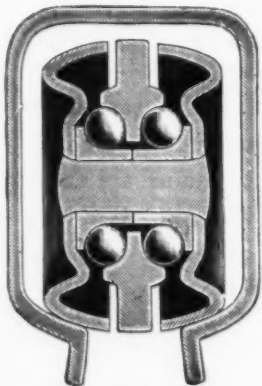


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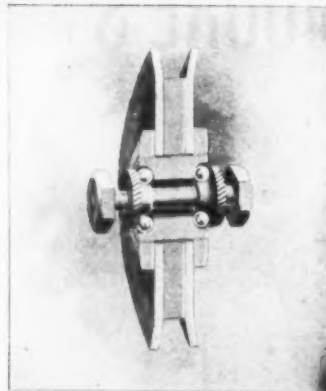
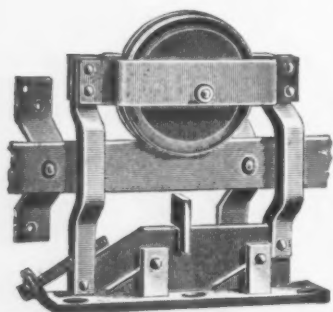
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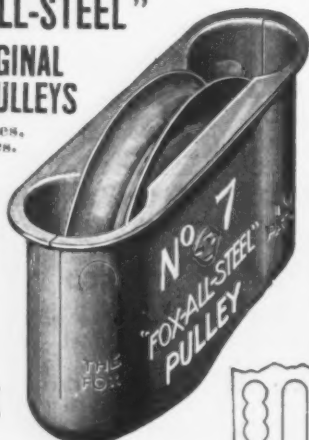
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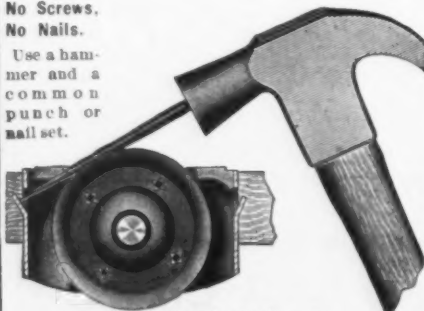
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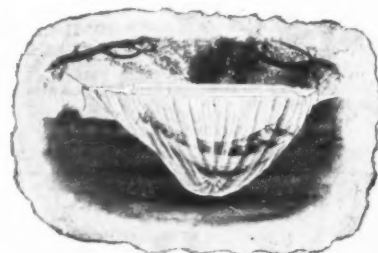
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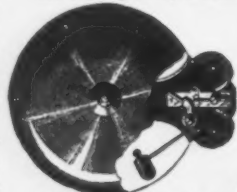
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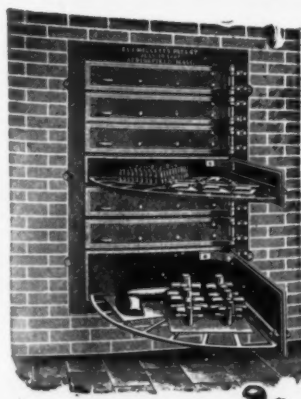


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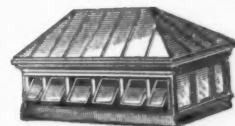
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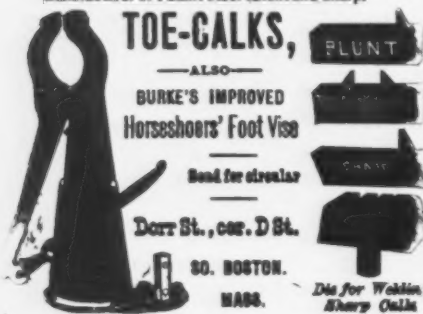
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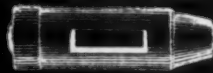
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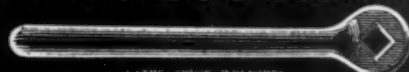
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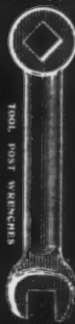
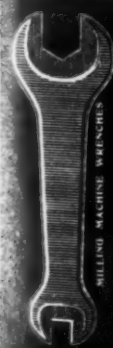
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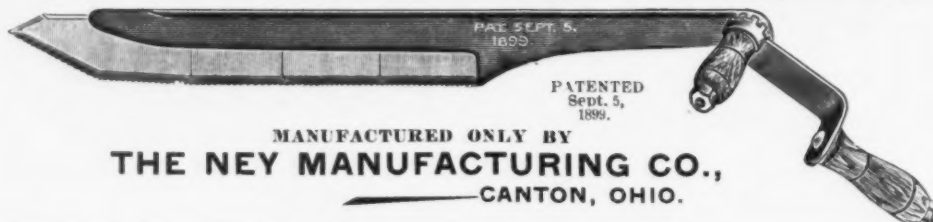
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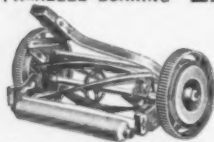
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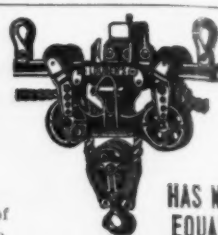
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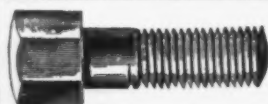
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Barnum, W. L.	107	Chisholm & Moore Mfg. Co.	142	Etting, Edw. J.	32	Harrington & King Perforat	114	Co.	11		
Barnum, W. L.	107	Chisholm & Moore Mfg. Co.	142			Harrington & King Perforat	114	Co.	11		

Laughlin, Alex. & Co.	40	Myers, F. E. & Bro.	117 & 122	Nash, Geo. & Co.	29	National Cutlery Co.	100	National Elastic Nut Co.	14	National Horse Nail Co.	128	National Iron & Wire Co.	112	National Machinery Co.	59	National Pipe Bending Co.	45	National Saw Co.	98	National Sewing Machine Co.	109	National Specialty Mfg. Co.	139	National Steel Co.	27	National Tube Co.	21	National Wire Corp.	13	Naugatuck Mfg. Co.	47	Ness, Geo. M., Jr.	115	New Albany Mfg. Co.	36	New Britain Hdw. Mfg. Co.	18	New Century Mfg. Co.	125	New Doty Mfg. Co.	72	New England Motor Co.	45	New England Steel Casting Co.	81	New England Structural Co.	20	New Freedom Wire Cloth Co.	18	Newhall, Henry B.	16	New Haven Mfg. Co.	64	New Haven Wire Mfg. Co.	5	N. J. Iron & Metal Co.	88	N. J. Wire Cloth Co.	12	Newkirk, J. B. & Co.	29	Newport News Shipbuilding & Dry Dock Co.	43	New Process Twist Drill Co.	58	N. Y. Air Compressor Co.	45	N. Y. Blower Co.	63	N. Y. Machinery Depot.	81	N. Y. Stamping Co.	104	Ney Mfg. Co.	130	Niagara Machine & Tool Works	71	Niagara Screw Co.	14	Nicholson File Co.	95 & 113	Nicol, & Co.	100	Nicoll, B. & Co.	88	Niles Tool Works Co.	76 & 82	Nilson, A. H. Mch. Co.	77	North American Metalline Co.	8	North Bros. Mfg. Co.	99	Northampton Emery Wheel Co.	85	Northern Engineering Works	81	Northern Emery Wheel Co.	56	Norton Mfg. Co.	101	Norwalk Iron Works Co.	48	Norwalk Pattern & Mfg. Co.	84	Norvett Mfg. Co.	118	Nut & Washer Mfg. Co.	14	Nuttall, R. D. Co.	73																																								
McCabe, J. J.	81	McCabe Hanger Mfg. Co.	16 & 123	McCaffrey File Co.	114	McClure, G. W., Son & Co.	40	McCoys, Jos. F. Co.	59	McCullough Iron Co.	24	McDowell, Stocker & Co.	84	McFarland, Wm.	6	McGowan, J. H. & Co.	48	McInnes, C. E.	26	McKay, Jas. & Co.	92	McKenna Bros. Brass Co.	121	McKinney Mfg. Co.	42	McNab & Harlin Mfg. Co.	87	Macbista supply Co.	7	Macomber & Whyte Rope Co.	1	Magnolia Metal Co.	49	Main Belting Co.	104	Maine Mfg. Co.	83	Manning, Maxwell & Moore.	80	Manville Machine Co., E. J.	126	Markham Air Rifle Co.	98	Markle Lead Works.	126	Marlin Fire Arms Co.	84	Marshall & Huschart Machy. Co.	100	Mason & Parker.	43	Mason Regulator Co.	2	Matthiessen & Hegeler Zinc Co.	35	Maurer, H. & Son.	85	May & Spalding.	111	Mayhew, H. H. Co.	39	Maywood Fdry & Mch. Co.	63	Merrill Bros.	1	Merriman, A. H.	67	Mersick, C. S. & Co.	71	Mesta Machine Co.	82	Michigan Wire Cloth Co.	13	Mietz, Aug.	42	Milbradt, G. A. & Co.	108	Miles, F. S.	17	Miller, C. & Son Co.	142	Miller, H. J.	16	Miller & Van Winkle.	142	Mills Falls Co.	96 & 142	Millett Core Oven Co.	122	Milne, A. & Co.	29	Milton Mfg. Co.	17	Milwaukee Tack Co.	14	Miner & Peck Mfg. Co.	67	Mitchell, W. B.	128	Mohr, J. J.	29	Monce, S. G.	96	Mooney, W. M. & Co.	128	Moore, C. P.	106	Moore, Franklin Co.	16	Morgan Construction Co.	11	Morgan Spring Co.	5	Morley Bros.	106	Morris, P. Hollingsworth.	35	Morrison, Robert.	41	Morrow, P. C.	129	Morse Twist Drill & Mch. Co.	39	Morse, Williams & Co.	55	Morton, Thos.	124	Morton Mfg. Co.	69	Moseley Iron Bridge & Roof	29	Moshier, Frank Co.	93	Mosher & Granville	78	Motoring Co.	78	Murford, J.	102												
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Quint, A. D.	65																																																																																																																																																						
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Bliss, E. W. Co., Brooklyn, N. Y.
Ferracute Mach. Co., Bridgeton, N. J.
Hay-Budden Mfg. Co., Brooklyn, N. Y.
Moosberg, Frank Co., Attleboro, Mass.
Richard Mfg. Co., Bloomington, Mass.
Wilson & Smith, Worcester, Mass.
- Door Bells.—See Bells and Gongs.**
- Door Checks and Springs**
Bardsley, Jos., 147 151 Baxter St., N. Y.
Ogden Mfg. Co., Newark, N. J.
Pullman Sash Balance Co., Rochester, N. Y.
- Door Holders**
Caldwell Mfg. Co., Rochester, N. Y.
- Draught Springs**
Burditt & Williams, Boston, Mass.
- Draw Benches**
Richard Mfg. Co., Bloomington, Mass.
Thompson, Hugh L., Waterbury, Ct.
- Drill Grinders**
Heald, L. S. & Son, Barre, Mass.
Sellers, Wm. & Co., Inc., Phila., Pa.
Washburn Shops of Worcester Polytechnic Inst., Worcester, Mass.
- Drill Press Work**
Straight Mfg. Co., Jamestown, N. Y.
- Drilling Machines**
Barnes, R. F. Co., Rockford, Ill.
Barnes, W. F. & John Co., Rockford, Ill.
Baush Mch. Tool Co., Springfield, Mass.
Bickford Drill & Tool Co., Cin., Ohio.
Bullard Machine Tool Co., Bridgeport, Ct.
Burham, Geo. Co., Worcester, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Mch. Tool Co., Cincinnati, O.
Dalliet, Thos. H. & Co., Philadelphia.
D'Amon & Littledale Mch. Co., 131 Worth St., N. Y.
Davis, W. I., Machine Co., Rochester, N. Y.
Detrick & Harvey Mch. Co., Baltimore, Md.
Foodick & Holloway Mach. Tool Co., Cincinnati, O.
Harrington, E. Son & Co., Phila., Pa.
Hill, Clarke & Co., Boston, Ind.
Hoefler Mfg. Co., Freeport, Ill.
Niles Tool Works Co., 136-138 Liberty St., N. Y.
Prentice Bros., Worcester, Mass.
Quint, A. D., Hartford, Conn.
Shuster, F. B. Co., New Haven, Conn.
Sibley & Ware, So. Bend, Ind.
Sigourney Tool Co., Hartford, Conn.
Silver Mfg. Co., Salem, O.
Slate Dwight Machine Co., Hartford, Ct.
Stow Flexible Shaft Co., Phila., Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
York S. M. Co., Cleveland, O.
- Drilling Machines, Automatic**
Gould & Eberhardt, Newark, N. J.
- Drive Chains**
Locke Steel Belt Co., Bridgeport, Conn.
- Drop Forgings**
Belden Machine Co., New Haven, Conn.
Billings & Spencer Co., Hartford, Conn.
Chicago Drop Forging & Fdry. Co., Kensington, Ill.
Clapp, E. D. Mfg. Co., Auburn, N. Y.
Consolidated Railway Electric Lighting & Equipment Co., 100 Broadway, N. Y.
Eccles, Richard, Auburn, N. Y.
Indianapolis Drop Forging Co., Indianapolis, Ind.
Keystone Drop Forge Co., Philadelphia.
Kilborn & Bishop Co., New Haven, Conn.
R. I. Tool Co., Providence, R. I.
Seranton Forging Co., Seranton, Pa.
Seward, W. & Son Co., New Haven, Ct.
Springfield Drop Forging Co., Springfield, Mass.
Stribley & Foote Co., Newark, N. J.
Transeau & Williams Co., Alliance, O.
Williams, J. H. & Co., Brooklyn, N. Y.
Wyman & Gordon, Worcester, Mass.
- Drop Hammers**
Billings & Spencer Co., Hartford, Conn.
Merrill Bros., Brooklyn, N. Y.
Williams, White & Co., Moline, Ill.
- Drop Presses**
Manville, E. J. Mch. Co., Waterbury, Ct.
Miner & Peck Mfg. Co., New Haven, Ct.
Moosberg & Granville Mfg. Co., Providence, R. I.
Vulcan Iron Works, Chicago, Ill.
- Dumb Waiters**
Energy Elevator Co., Philadelphia, Pa.
Speidel, J. G., Reading, Pa.
Storm Mfg. Co., Newark, N. J.
Variety Machine Co., Warsaw, N. Y.
- Dump Cars**
Atlas Bolt & Screw Co., Cleveland, O.
- Dynamos and Motors, Electric**
Eddy Electric Mfg. Co., Windsor, Conn.
General Electric Co., Schenectady, N. Y.
New England Motor Co., Lowell, Mass.
Sturtevant, E. F. Co., Boston, Mass.
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.
- Eave Troughs**
Kanneberg Rfg. Co., Canton, O.
- Eave Trough Hangers**
Berger Bros. Co., Philadelphia, Pa.
Oatman Bros., Medina, O.
- Edge Tools**
Buck, Chas., Millbury, Mass.
Buck Bros., Millbury, Mass.
Ferro-Carbon Castings Co., Phila., Pa.
White, L. & I. J. Co., Buffalo, N. Y.
- Egg Beaters**
Lyon, Nelson, Albany, N. Y.
Standard Co., Boston, Mass.
- Egg Opener**
Hartigan, W. R., Collinsville, Ct.
- Electric Bells and Supplies**
Ostrander, W. R. & Co., 204 Fulton St.
- Electric Lighting and Power Apparatus**
Eddy Electric Mfg. Co., Windsor, Conn.
General Electric Co., Schenectady, N. Y.
- Electrical Apparatus**
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.
- Elevators, Makers of**
Eastern Machinery Co., New Haven, Ct.
Energy Elevator Co., Philadelphia, Pa.
Link-Belt Engineering Co., Phila., Pa.
Morse, Williams & Co., Phila., Pa.
Ridgway, Craig & Son Co., Coatesville, Pa.
Speidel, J. G., Reading, Pa.
Variety Machine Co., Warsaw, N. Y.
- Elevator Buckets**
Clark, W. J. & Co., Salem, O.
Cleveland Elevator Bucket Co., Cleveland, O.
- Elevator Enclosures and Cabs**
Ludlow Saylor Wire Co., St. Louis, Mo.
- Emery**
Tantle Co., Stroudsburg, Pa.
- Emery Wheels**
American Emery Wheel Works, Providence, R. I.
Best, L., 45 Vesey St., N. Y.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
Buffalo Emery Wheel Co., Buffalo, N. Y.
Nazel, John, Phila., Pa.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Safety Emery Wheel Co., Springfield, O.
Springfield Mfg. Co., Bridgeport, Conn.
Sterling Emery Wheel Co., Tiffin, O.
Tantle Co., Stroudsburg, Pa.
Vitrified Emery Wheel Co., Westfield, Mass.
- Emery Wheel Dresser**
Chicago Screw Co., Chicago, Ill.
Dickinson, Thos. L., 45 Vesey St., N. Y.
- Enameled Ware**
Bellwire Stamping Co., Harvey, Ill.
- Engineers and Contractors**
Aiken, Henry, Pittsburgh, Pa.
Erikson, Edw. E., Pittsburgh, Pa.
Foster & Snow, W. Milwaukee, Wis.
Fryer Miller Engineering Co., Pittsburgh, Pa.
Hevl & Patterson, Pittsburgh, Pa.
Huber, S. V. Co., Pittsburgh, Pa.
Kennedy, Julian, Pittsburgh, Pa.
Kennedy, Walter, Pittsburgh, Pa.
Lamond, David, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
- McClure, G. W. Son & Co.**, Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Penna. Engineering Wks., New Castle, Penna.
Ritter-Conley Mfg. Co., Pittsburgh, Pa.
Smythe, S. K. Co., Inc., Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
Thompson, Hugh L., Waterbury, Ct.
Wellman Seaver Engineering Co., Cleveland, O.
- Engines**
Gas.
Mietz, Aug., 125-138 Mott St., N. Y.
Northern Engineering Works, Detroit, Mich.
Gasoline.
Charter Gas Engine Co., Sterling, Ill.
Stover Engine Works, Freeport, Ill.
Weber Gas & Gasoline Engine Co., Kansas City, Mo.
Watkins, F. M., Cincinnati, O.
Kerosene.
Mietz, Aug., 125-138 Mott St., N. Y.
Steam.
Allis, E. P. Co., Milwaukee, Wis.
Boston Flower Co., Hyde Park, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Filler & Stowell Co., Milwaukee, Wis.
Newport News Shipbuilding & Dry Dock Co., 1 Broadway, N. Y.
Sennett Geo. B. Co., Youngstown, O.
Southward Fdry. & Mch. Co., Philadelphia, Pa.
Sturtevant, B. F. Co., Boston, Mass.
Tod, William & Co., Youngstown, O.
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.
Wetherill, Robt. & Co., Chester, Pa.
- Engines, Marine**
Lake City Engineering Co., Erie, Pa.
- Engines, Second Hand**
Everson, B. M., Pittsburgh, Pa.
- Engravers**
Muzford, A., Hartford, Conn.
- Expanding Mandrels**
LeCount, Wm. G., So. Norwalk, Conn.
- Expansion Bolts**
Church, Isaac Toledo, O.
Evan, F. H., Brooklyn, N. Y.
McCabe Hanger Mfg. Co., 533-543 W. 23d St., N. Y.
Newhall Henry B. Co., N. Y.
Seaman D. C. & Co., Philadelphia, Pa.
Steward & Komaine Mfg. Co., Phila., Pa.
- Farmers' Tools**
Champion Tool Co., Ltd., Conneaut Lake, Pa.
Heller Bros. & Co., Newark, N. J.
- Faucets**
McKenna Bros. Brass Co., Ltd., Pittsburgh, Pa.
- Faucets, Wooden**
Boston & Lockport Block Co., Boston.
Sommer's, John, Son, Newark, N. J.
- Feed Cutters**
Silver Mfg. Co., Salem, O.
- Feed Water Heaters and Purifiers**
Harrisburg Pipe Bending Co., Harrisburg, Pa.
Harrison Safety Boiler Works, Philadelphia, Pa.
Kelly, B. F. & Son, 91 Liberty St., N. Y.
National Pipe Bending Co., New Haven.
Patterson, F. L., 135 Liberty St., N. Y.
Taunton Locomotive Mfg. Co., Taunton, Mass.
Webster, Warren & Co., Camden, N. J.
Whitlock Coil Pipe Co., Hartford, Ct.
- Fencing, Iron and Wire**
Adam, W. J., Joliet, Ill.
American Steel & Wire Co., Chicago, Ill.
Barnum, E. T., Detroit, Mich.
Bribe, A., Jersey City, N. J.
Clinton Wire Cloth Co., Clinton, Mass.
DeKalb Fence Co., DeKalb, Ill.
Driggins Wire Fence Co., Anderson, Ind.
Ellis & Halfenbarger, Indianapolis, Ind.
Frost Wire Fence Co., Cleveland, O.
Gilbert & Bennett Mfg. Co., 44 Cliff St.
Hartman Mfg. Co., 399 Broadway, N. Y.
Kilmer Wire Mfg. Co., Chicago, Ill.
Kokomo Fence Mch. Co., Kokomo, Ind.
Ludlow Saylor Wire Co., St. Louis, Mo.
Ornamental Iron & Wire Co., Chattanooga, Tenn.
Rossmen Woven Wire Fence Co., Rossmen, N. Y.
Stewart Iron Works, Cincinnati, Ohio.
Up-to-date Mfg. Co., Terre Haute, Ind.
- Ferro-Chromium**
Willson Aluminum Co., 99 Cedar Street, N. Y.
- Files and Rasps**
Manufacturers of
Arcade File Works, Anderson, Ind.
Barnett, G. & H. Co., 41 & 43 Richmond Phila.
Diaston, Henry & Sons, Inc., Phila., Pa.
Heller Bros. Co., Newark, N. J.
McCaffrey File Co., Philadelphia.
Nicholson File Co., Providence, R. I.
Stokes Bros. Mfg. Co., Freehold, N. J.
- Filters**
Scaife, Wm. B. & Sons, Pittsburgh, Pa.
- Fine Tool Work**
Straight Mfg. Co., Jamestown, N. Y.
- Finished Castings**
Franklin, H. H. Mfg. Co., Syracuse.
- Fire Brick**
Borgner, Cyrus, Philadelphia, Pa.
Gardner Bros., Cumberland, Md.
Haws, W. H. Fire Brick Co., Mt. Union.
Maurer, H. & Son, 421 E. 25d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Presbrey Fire Brick Co., Taunton, Mass.
Valentine, M. D. & Bro. Co., Woodbridge.
- Fire Extinguishers**
International Sprinkler Co., Phila., Pa.

American Tool Wks. Co., Cincinnati, O.
 Baird, U. Machinery Co., Pittsburgh, Pa.
 Barnes, W. F. & John Co., Rockford, Ill.
 Baugh Mch. Tool Co., Springfield, Mass.
 Becker Brinard Milling Mach. Co., Hyde Park, Mass.
 Bliss E. W. Co., Brooklyn, N. Y.
 Bowler, Geo. H., Cleveland, O.
 Briggs, Marvin, 13 Broadway, N. Y.
 Brown & Sharpe Mfg. Co., Providence.
 Bullard Mch. Tool Co., Bridgeport, Ct.
 Carlin Machinery & Supply Co., Allegheny, Pa.
 Carlin's Sons Thos., Allegheny, Pa.
 Cincinnati Milling Mach. Co., Cincinnati, O.
 Cincinnati Planer Co., Cincinnati, O.
 Cornell, J. B. & J. M., 26th St. and 11th Ave., New York City.
 Davis, W. P. Machine Co., Rochester, N. Y.
 Dawson, A. L. & Co., Chicago, Ill.
 Dawson & Goodwin, Chicago, Ill.
 Detrick & Harvey Mch. Co., Baltimore, Md.
 Diamond Drill & Mch. Co., Birdsboro, Pa.
 Dunn, J. B. & Co., Chicago, Ill.
 Draper Mach. Tool Co., Worcester, Mass.
 Du Bois Iron Works, Du Bois, Pa.
 Farrel Fdry & Mch. Co., Ansonia, Conn.
 Ferracute Machine Co., Bridgeport, N. J.
 Fish, H. C. Machine Works, Worcester, Mass.
 Garvin Machine Co., Spring and Varick Sts., N. Y.
 General Supply Co., 40 John St., N. Y.
 Geometric Drill Co., Westville, Conn.
 Gray, Robt. J., 52-54 E. 132d St., N. Y.
 Hannan & Finton, Springfield, Mass.
 Hendey Machine Co., Torrington, Conn.
 Hill, Henry F., Boston, Mass.
 Hill, Clarke & Co., Boston, Mass.
 Illinois Maintenance Co., Chicago, Ill.
 Johnson, Israel, Jr., & Co., Phila.
 Johnson, Wm. C. & Sons Mch. Co., St. Louis, Mo.
 Kaiser, A. V. & Co., Phila., Pa.
 Lodge & Shipley Mch. Tool Co., Cin., O.
 Lund, S. T., Boston, Mass.
 McCabe, J. J., 14 Day Street, N. Y.
 McDowell & Co., Pittsburgh, Pa.
 McDowell & Co., Chicago.
 Machinists' Supply Co., Rochester, N. Y.
 Manning, Maxwell & Moore, 83-89 Liberty St., N. Y.
 Manville, E. J. Mach. Co., Waterbury, Ct.
 Marshall & Huchart Mch. Co., Chicago, Ill.
 Mossberg, Frank Co., Attleboro, Mass.
 National Machine & Co., Tiffin, Ohio.
 New Doty Mfg. Co., Janesville, Wis.
 New Haven Mfg. Co., New Haven, Conn.
 New York Machinery Depot, 178 Broadway, New York.
 Niles Tool Works Co., 138 Liberty St., N. Y.
 Nilson, A. H. Mch. Co., Bridgeport, Ct.
 Paradox Machinery Co., Chicago, Ill.
 Pennsylvania Machine Co., Phila., Pa.
 Phila. Machine Tool Co., Phila., Pa.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Pond Machine Tool Co., Plainfield, N. J.
 Poole, Robt. & Son Co., Baltimore, Md.
 Potter & Johnston Co., Pawtucket, R. I.
 Poutier & Co., Phila., Pa.
 Pratt & Whitney Co., Hartford, Conn.
 Proutie Bros., Worcester, Mass.
 Proutie Tool & Supply Co., 115 Liberty St., N. Y.
 Raimier & Williams, Chicago, Ill.
 Reade, Wm. A. & Co., Cleveland, O.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Sigourney Tool Co., Hartford, Conn.
 L. H. Hart Machinery & Equipment Co., Cleveland, O.
 Thomas & Lowe Machinery Co., Providence, R. I.
 Toomey, Frank, Philadelphia, Pa.
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
 Wetherill, Robert & Co., Chester, Pa.
 Wicks Bros., Pittsburgh, Pa.
 Windsor Machine Co., Windsor, Vt.
 Wisconsin Machinery Co., Milwaukee, Wis.
 Wormer, C. C. Mch. Co., Detroit, Mich.
 York, S. M. Co., Cleveland, O.

Machinery, Wood Working
 DeLance Machine Wks., DeLance, O.
 Fay, J. A. & Egan Co., Cincinnati, O.

Machinery Springs
 Scott, Chas. Spring Co., Phila., Pa.

Machinery Builders
 Chapman, J. B. & Co., Springfield, Mass.

Machine Needles
 Excelsior Needle Co., Torrington, Ct.

Machine Screws—See Screws, Machine

Machine Screw Work
 Spencer Automatic Mch. Screw Co., Hartford, Conn.

Machine Tools—See Machinery

Machine Work
 Gould, R. D. & Co., Pittsburgh, Pa.

Machine Wrenches
 Billings & Spencer Co., Hartford, Conn.

Machinists' Scales
 Starrett, L. S. Co., Athol, Mass.

Machinists' Tools and Supplies
 Billings & Spencer Co., Hartford, Conn.
 General Supply Co., 40 John St., N. Y.
 Keane Mfg. Co., Buffalo, N. Y.
 King, J. M. & Co., Watford, N. Y.

Magnetic Separators
 Ross, Geo. V. Co., Phila., Pa.

Manganese Bronze
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Manufacturing Properties
 Harrisburg Fdry & Mch. Wks., Harrisburg, Pa.
 Hillman, J. H. & Co., Pittsburgh, Pa.

Manufacturing Sites
 Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.
 Louisville & Nashville R. R., Louisville, Ky.
 Southern Railway Co., Washington, D. C.

Measuring Machines
 Rogers, Jno. M. Box, Gauge & Drill Wks., Gloucester City, N. J.

Meat Choppers
 Brown, H. S. & Co., 16 Duane St., N. Y.
 Enterprise Mfg. Co. of Pa., Phila., Pa.
 Peck, Stow & Wilcox Co., 27 Murray St., New York.

Streeter, N. R. & Co., Rochester, N. Y.
 Woodruff, O. D., Pottstown, Pa.

Metal Brokers
 American Metal Co., 52 Broadway, N. Y.

Metals
 Hendricks Bros., 49 Cliff St., N. Y.
 Hoeller, Theo. & Co., Buffalo, N. Y.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
 Rutter, A. T., 256 Broadway, N. Y.
 United Metals Selling Co., 11 Broadway, N. Y.

Metal Goods Manufacturers
 Straight Mfg. Co., Jamestown, N. Y.

Metal Polish
 Hoffman, Geo. W., Indianapolis, Ind.

Metal Spinning
 Goodwin & Kintz Co., Winsted, Conn.

Metal Wheels
 Electric Wheel Co., Quincy, Ill.

Milling Machines
 Adams, J. C., Dubuque, Iowa.
 Becker-Brinard Milling Machine Co., Hyde Park, Mass.
 Brown & Sharpe Mfg. Co., Providence.
 Carter & Hake Mach. Co., Winsted, Ct.
 Cincinnati Milling Mach. Co., Cincinnati, O.
 Fox Machine Co., Grand Rapids, Mich.
 Garvin Machine Co., Spring and Varick Sts., N. Y.
 Niles Tool Works Co., 138-139 Liberty St., N. Y.
 Shuster, F. B. Co., New Haven, Conn.
 Thurston Mfg. Co., Providence, R. I.

Mining Knives
 Bishop, Geo. H. & Co., Cincinnati, O.
 Palmer Hdw. Mfg. Co., Troy, N. Y.

Mining Machinery
 Mills, E. F. Co., Milwaukee, Wis.
 Rand Drill Co., 125 Broadway, N. Y.

Mining Screens
 Harrison & King Perforating Co., Chicago, Ill.
 Howard & Morse, 45 Fulton St., N. Y.
 Michigan Wire Cloth Co., Detroit, Mich.

Miter Boxes
 Thomson Bros. & Co., Lowell, Mass.

Molding Machines
 Adams, O., Dubuque, Iowa.
 Maywood Fdry. & Mch. Co., Chicago.

Motor Fans
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Motors, Air
 Stow Flexible Shaft Co., Phila., Pa.

Motors, Electric—See Dynamometers and Motors, Electric

Nail Clippers
 Cook, H. C. Co., Ansonia, Conn.

Nail Machinery
 Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nail Pullers
 Hagen & Reid, Troy, N. Y.
 Scranton & Co., The New Haven, Conn.
 Smith & Hemenway Co., 256 Broadway, N. Y.
 Snow, L. T., New Haven, Conn.

Name Plates, Machinery
 Morlock Parlor Grate Co., Boston, Mass.

Natural Gas Pumps
 Norwalk Iron Wks. Co., So. Norwalk, Ct.

Nickel Platers' Supplies
 Eddy Electric Mfg. Co., Windsor, Conn.

Nickeloid
 American Nickeloid Co., Peru, Ill.

Norway Shapes
 Rowland, William & Harvey, Frankford, Philadelphia.

Nuts—See Bolts

Nuts, Self-Locking
 National Elastic Nut Co., Milwaukee, Wis.

Nut Machines
 Dunham Nut Co., Unionville, Conn.

Oil Burning Appliances
 Rockwell Engineering Co., 26 Cortlandt St., N. Y.

Oil Extractor
 Reed & Curtis Mch. Screw Co., Worcester, Mass.

Oil Heaters—See Oil Stoves

Oil Stones
 Pike Mfg. Co., Pike Station, N. H.

Oil Stoves—(See Stoves Oil, Vapor and Gasoline)

Oilers
 Hay State Stamping Co., Worcester, Mass.
 Gem Mfg. Co., Pittsburgh, Pa.
 Hammer & Co., Branford, Conn.
 Stoutenburg Mfg. Co., Kethsburg, Ill.
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

Oilless Bearings
 North American Metalline Co., Long Island City, N. Y.

Ore Breakers
 Aultman Co., Canton, O.
 Cresson, Geo. V. Co., Phila., Pa.

Ores
 Blair, Reed F. Co., Pittsburgh, Pa.
 Samuel, Frank, Philadelphia, Pa.
 Wister, Francis, Philadelphia, Pa.

Ovens, Portable
 Biddgett, G. S. Co., Burlington, Vt.

Ox Shoes
 Seranton Forging Co., Seranton, Pa.
 Woodruff, Walter W. & Sons, Mt. Carmel, Conn.

Packing
 Boston Belting Co., Boston, Mass.
 Morrison, Robert, St. Louis, Mo.
 Peerless Rubber Mfg. Co., 16 Warren Street, N. Y.

Packing, Iron
 Smooth On Mfg. Co., Jersey City, N. J.

Padlocks
 Graham, John H. & Co., 113 Chambers Street, New York.

Paints
 Dixon, Jos. Crucible Co., Jersey City.
 Standard Paint Co., 77-79 John St., N. Y.

Pants Stretcher
 Covert Mfg. Co., West Troy, N. Y.

Patent Solicitors
 Goepel & Haegener, 290 Broadway, N. Y.
 Bowden & Howson, Philadelphia and Washington.
 Stocking, E. B., Washington, D. C.

Patterns
 Balkwill Pattern Wks., Cleveland, O.
 Norwalk Pattern & Mfg. Co., So. Norwalk, Conn.

Pattern Letters
 Butler, A. G., 103 Beckman St., N. Y.
 St. Louis Electrotyp Foundry, St. Louis

Perforated Metal
 Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Phosphor Bronze
 Hungerford, U. T. Brass & Copper Co., Philadelphia, Pa.
 Phosphor Bronze Smelting Co., Limited, Philadelphia.

Phosphor Tin
 Crescent Phosphorized Metal Co., Philadelphia, Pa.
 Haik & Naumann, 515 Pearl St., N. Y.
 Syracuse Smelting Wks., Syracuse, N. Y.

Picture Wire
 Ossawa Mills Co., Norwich, Conn.

Pig Casting Machines
 Heyl & Patterson, Pittsburgh, Pa.

Pig Iron
 Alabama Consolidated Coal & Iron Co., Birmingham, Ala.
 Baird, C. H. & Co., Phila., Pa.
 Cherry Valley Iron Co., Pittsburgh, Pa.
 Dimmick, J. K. & Co., Phila., Pa.
 Hickman, Williams & Co., Chicago, Ill.
 Houston, B. B. & Co., Philadelphia, Pa.
 Nicoll, B. & Co., 346 Wall St., N. Y.
 Republic Iron & Steel Co., Chicago.
 Samuel, Frank, Philadelphia, Pa.
 Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.
 Snyder, W. P. & Co., Pittsburgh, Pa.
 Superior Charcoal Iron Co., Grand Rapids, Mich.
 Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
 Virginia Iron, Coal and Coke Co., Bristol, Va.—Tenn.

Pig Iron Analysis
 Church, S. R., San Francisco, Cal.

Pig Iron Storage
 Am. Pig Iron Storage Warehouse Co., 4 Wall St., N. Y.

Pile Drivers
 Edson Mfg. Co., Boston, Mass.
 Vulcan Iron Works, Chicago, Ill.

Pipers
 Washington Tool Co., Owatonna, Wis.

Pipe, Bent
 Harrisburg Pipe Bending Co., Harrisburg, Pa.
 National Pipe Bending Co., New Haven, Conn.
 National Tube Co., Pittsburgh, Pa.
 Whitlock Coil Pipe Co., Hartford, Ct.

Pipe Coupling
 Williams, J. H. & Co., Brooklyn, N. Y.

Pipe Cutting and Threading Machines
 Bignal & Keeler Mfg. Co., Edwardsville, Ill.
 Curtis & Curtis, Bridgeport, Conn.
 Jarecki Mfg. Co., Erie, Pa.
 Merrill Mfg. Co., Toledo, O.
 Saunders' Sons, D., Yonkers, N. Y.

Pipe Grips
 Prentiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c.
 Jarecki Mfg. Co., Erie, Pa.
 McNab & Harlin Mfg. Co., N. Y.

Pipe, Riveted Steel
 Pollock, W. R. Co., Youngstown, O.
 Scaife, Wm. B. & Sons, Pittsburgh.
 Warren City Boiler Works, Warren, O.

Pipe, Water and Gas
 Blair, C. & Son Co., Utica, N. Y.
 National Tube Co., Pittsburgh, Pa.
 Red Jacket Mfg. Co., Davenport, Iowa.
 U. S. Cast Iron Pipe & Foundry Co., Phila., Pa.
 Wood, R. D. & Co., Philadelphia, Pa.

Piston Rods, Tobin Bronze
 Ansonia Brass & Copper Co., 99 John St., N. Y.

Planes
 Stanley Rule & Level Co., N. Y.

Planers
 Amer. Tool Works Co., Cincinnati, O.
 Baird, U. Machinery Co., Pittsburgh, Pa.
 Cincinnati Planer Co., Cincinnati, Ohio.
 Detrick & Harvey Mch. Co., Baltimore.
 Draper Mch. Tool Co., Worcester, Mass.
 Pond Machine Tool Co., Plainfield, N. J.
 Whitcomb Mfg. Co., Worcester, Mass.
 Wilson, W. A., Rochester, N. Y.

Plated Ware
 International Silver Co., Meriden, Ct.

Plates, Iron and Steel
 Jones & Laughlins, Ltd., Pittsburgh, Pa.
 Lukens Iron & Steel Co., Coatesville, Pa.
 Singer, Nimick & Co., Inc., Pittsburgh, Pa.
 Wood, Alan Co., Philadelphia.

Plate Iron Work
 Scaife, Wm. B. & Sons, Pittsburgh.

Pliers
 Bridgeport Mfg. Co., Bridgeport, Conn.
 Cronk Hanger Co., Elmira, N. Y.
 Utica Drop Forge & Tool Co., Utica, N. Y.

Pneumatic Tools
 Phila. Pneumatic Tool Co., Phila., Pa.

Pocket Knives
 Cattaraugus Cutlery Co., Little Valley, N. Y.

Polishing Wheels
 Divine Bros. Co., Utica, N. Y.

Portable Track
 Atlas Bolt & Screw Co., Cleveland, O.

Poultry Fencing
 DeKalb Fence Co., DeKalb, Ill.

Poultry Nettings
 Gilbert & Bennett Mfg. Co., 44 Cliff St., N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.
 Tyler, W. S. Co., Cleveland, O.
 Wright & Colton Wire Cloth Co., Worcester, Mass.

Power Hack Saws
 Hoefler Mfg. Co., Freeport, Ill.

Power Hammers
 Beaudry & Co., Boston, Mass.
 Bradley Co., Syracuse, N. Y.
 Dineen & Eisenhardt, Philadelphia.
 Dupont Mfg. Co., St. Johnsbury, Vt.
 Kidder, R. E., Worcester, Mass.
 Long & Allstatter Co., Hamilton, Ohio.
 Miner & Peck Mfg. Co., New Haven, Conn.
 Scranton & Co., The, New Haven, Conn.

Power Transmitting Mach'y
 Cresson, Geo. V. Co., Phila., Pa.
 Dodge Mfg. Co., Mishawaka, Ind.
 Norwalk Iron Wks. Co., So. Norwalk, Ct.

Pressed Metal Work
 Avery Stamping Co., Cleveland, Ohio.

Presses, Power
 Adriance Mach. Works, Brooklyn, N. Y.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Cross & Speira Mch. Co., Waterbury, Ct.
 Ferracute Mach. Co., Bridgeport, N. J.
 Hibbard, W. H., Brooklyn, N. Y.
 Hilles & Jones Co., Wilmington, Del.
 Leffler, Chas. & Co., Brooklyn, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Ct.
 Merriman, A. H., Meriden, Conn.
 Mossberg & Granville Mfg. Co., Providence, R. I.
 Niagara Machine & Tool Wks., Buffalo.
 Perkins Machine Co., Boston, Mass.
 Phila. Machine Tool Co., Phila., Pa.
 Rudolph & Krummel, Chicago, Ill.
 Shuster, F. B. Co., New Haven, Conn.

Projectiles
 National Tube Co., Pittsburgh, Pa.

Pulleys
 Amer. Pulley Co., Phila., Pa.
 Dodge Mfg. Co., Mishawaka, Ind.
 Eastern Machinery Co., New Haven, Ct.
 Evans, G. F., Boston, Mass.
 Hess Snyder & Co., Massillon, O.
 Jones & Laughlins Ltd., Pittsburgh, Pa.
 Saginaw Mfg. Co., Saginaw, Mich.
 Woods, T. B. Sons, Chambersburg, Pa.

Pump Chains
 Garland Chain Co., Rankin Station, Pa.

Pumping Machinery
 Cook, A. D., Lawrenceburg, Ind.
 Filer & Stowell Co., Milwaukee, Wis.
 Ingersoll-Sergeant Drill Co., 35 Cortlandt St., N. Y.
 Lake City Engineering Co., Erie, Pa.
 McEwan, J. H. & Co., Cincinnati, O.
 Southwick Fdry. & Mch. Co., Philadelphia, Pa.

Pumps
 Athol Pump Co., Athol, Mass.
 Barnes Mfg. Co., Mansfield, O.
 Deming Co., Salem, O.
 Flint & Walling Co., Kendallville, Ind.
 Hoss, Snyder & Co., Massillon, O.
 Humphreys Fdy. Co., Mansfield, O.
 Myers, F. E. & Bro., Ashland, Ohio.
 Red Jacket Mfg. Co., Davenport, Ia.
 St. Joseph Pump & Mfg. Co., St. Joseph, Mo.
 Wilder, S. & Co., Holliston, Mass.

Punches, Conductors'
 Woodman, R. Mfg. & Supply Co., Boston, Mass.

Punches and Shears, Hand and Power
 Bethlehem Foundry & Machine Co., So. Bethlehem, Pa.
 Bicknell Hdw. Co., Jacksonville, Wis.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Hilles & Jones Co., Wilmington, Del.
 Long & Allstatter Co., Hamilton, Ohio.
 Mersick, S. & Co., New Haven, Conn.
 New Doty Mfg. Co., Janesville, Wis.
 Williams, White & Co., Moline, Ill.

Punching and Shearing
 Harrington & King Perforating Co., Chicago, Ill.

Push Carts
 Syracuse Chilled Plow Co., Syracuse.

Pyrometers
 Brown, Edward, Phila., Pa.
 Gehling, Steinbart & Co., Ltd., Carlstadt, N. J.

Railways, Industrial
 Hunt, C. W. Co., West New Brighton, N. Y.

Rat and Mouse Traps
 Burditt & Williams, Boston, Mass.

Ratchet Drills
 Keystone Mfg. Co., Buffalo, N. Y.

Razors
 Buck Bros., Milbury, Mass.

Razor Hones
 Pike Mfg. Co., Pike Station, N. H.

Reamers
 Morse Twist Drill & Mch. Co., New Bedford, Mass.

Recording Gauges
 Bristol Co., Waterbury, Conn.
 Gehling, Steinbart & Co., Ltd., Carlstadt, N. J.

Reels
Hendryx, A. B. Co., New Haven, Conn.
Refrigerating Machinery
York Mfg. Co., York, Pa.
Refrigerators
Maine Mfg. Co., Nashua, N. H.

Registers
Seavey Mfg. Co., Boston, Mass.
Stowell Mfg. & Foundry Co., So. Milwaukee, Wis.

Relaying Rails
Block & Oak Iron Co., Chicago, Ill.
Donaldson & Newton, Phila., Pa.
Isaac Joseph Iron Co., Cincinnati, O.
May & Spalding, Atlanta, Ga.
Steel & Rail Supply Co., 330 B'way, N. Y.

Reloading Tools
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.
Ideal Mfg. Co., New Haven, Conn.

Repairing Sets, Family
Mitchell, W. B., Chicago, Ill.
Star Heel Plate Co., Newark, N. J.

Repair Outfits, Farmers'
Imperial Bit & Snap Co., Racine, Wis.
Revolution Counters
Pitkin, A. B., Machry, Co., Providence.
Tabor Mfg. Co., Elizabeth, N. J.

Revolvers
Harrington & Richardson Arms Co., Worcester, Mass.
Johnson, Iver, Arms & Cycle Works, Fitchburg, Mass.

Rifles
Marlin Fire Arms Co., New Haven, Ct.
Remington Arms Co., 315 B'way, N. Y.
Stevens Arms & Tool Co., Chicopee Falls, Mass.

Ring Rollers
Shuster, F. B. Co., New Haven, Conn.

Riveters
Phila. Pneumatic Tool Co., Phila., Pa.

Rivets
American Iron & Steel Mfg. Co., Lebanon, Pa.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Burden Iron Co., Troy, N. Y.
Clark & Cowles, Plainville, Conn.
Cobb & Drew, Plymouth, Mass.
Garland & Co., Rankin station, Pa.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.
Lanz, M. & Son, Pittsburgh, Pa.
McInnes, C. E. & Co., Phila., Pa.
Plymouth Mills, Plymouth, Mass.
Rockford Bolt Works, Rockford, Ill.
Townsend C. C. & E. P., New Brighton, Pa.

Riveting Machines
Bethlehem Foundry & Mch. Co., So. Bethlehem, Pa.
Shuster, F. B. Co., New Haven, Conn.

Roll Mill Machinery
Bradford Machine & Mfg. Co., Bradford, Pa.
Morgan Construction Co., Worcester, Mass.

Roll Turning Tools
Trethewey, Sam'l & Co., Ltd., Pittsburgh

Roller Bearings
Ball Bearing Co., Boston, Mass.
Mossberg & Granville Mfg. Co., Providence, R. I.

Rolling Mill Machinery
Booth, The Lloyd Co., Youngstown, O.
Ferson, B. M., Pittsburgh, Pa.
Farrell Fdry & Mch. Co., Ansonia, Ct.
Frank-Kneeland Mch. Co., Pittsburgh.
Garrison, A. Foundry Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Mossberg & Granville Mfg. Co., Providence, R. I.
Penna. Engineering Wks., New Castle, Penna.
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel
Birmingham Iron Fdry., Derby, Conn.
Booth, The Lloyd Co., Youngstown, O.
Farrell Fdry & Mch. Co., Ansonia, Ct.
Frank-Kneeland Mch. Co., Pittsburgh.
Garrison, A. Fdry. Co., Pittsburgh, Pa.
Lorain Foundry Co., Lorain, Ohio.
Mesta Machine Co., Pittsburgh, Pa.
Phila. Roll & Mch. Co., Philadelphia, Pa.
Seam & Sheet Co., Pittsburgh.
Totten & Hogg Iron and Steel Fdry. Co., Pittsburgh, Pa.
Youngstown Foundry & Machine Co., Youngstown, O.

Roofing and Siding
Asphalt ready roofing Co., 136 Water St., N. Y.
Garry Iron & Steel Roofing Co., Cleveland, O.
Kaneberg Roofing Co., Canton, O.
Sealife, Wm. B. & Sons, Pittsburgh.
Youngstown Iron & Steel Roofing Co., Youngstown, O.

Rope and Cordage
American Mfg. Co., 65 Wall St., N. Y.
Warburg Rope Co., 69 South St., N. Y.

Rope and Web Goods
Covert Mfg. Co., West Troy, N. Y.
Rope Shield
Ironclad Co., Columbus, Ohio.

Rope Transmission and Hoisting
American Mfg. Co., 65 Wall St., N. Y.
California Wire Works, San Francisco.
Hunt, C. W. Co., West New Brighton, N. Y.

Rubber Goods
Leschen, A. & Sons, Rope Co., St. Louis.
Wool T. B. Sons Chambersburg, Pa.

Rubber Scrap
Hoffler, Theo. & Co., Buffalo, N. Y.

Rules
Luffkin Rule Co., Saginaw, Mich.
Stanley Rule & Level Co., 29 Chambers St., N. Y.

Sad Irons
Enterprise Mfg. Co., Phila., Pa.
Williams, A. C., Ravenna, O.

Sand Blast Apparatus
Ward, Edgar T. & Sons, Boston, Mass.

Sand Paper
Baeder, Adamson & Co., Phila., Pa.

Sash Balances
Caldwell Mfg. Co., Rochester, N. Y.
Fullman Sash Balance Co., Rochester, N. Y.

Sash Cords and Chains
Bridgeport Chain Co., Bridgeport, Conn.
Morton, Thos., 65 Elizabeth, N. Y.
Samson Cordage Works, Boston, Mass.

Sash Locks
Fitch, W. & E. T. Co., The, New Haven, Conn.

Sash Pulleys
Fox Machine Co., Grand Rapids, Mich.
Grand Rapids Hardware Co., Grand Rapids, Mich.
Palmer Hardware Mfg. Co., Troy, N. Y.

Sash Weights
Barney & Reed Mfg. Co., Boston, Mass.
Brown, E. E. & Co., Philadelphia, Pa.

Sausage Stuffers
National Specialty Mfg. Co., Phila., Pa.

Saws
Atkins, E. C. & Co., Indianapolis, Ind.
Bishop, Geo. H. & Co., Cincinnati, Ohio.
Disston, Henry & Sons, Inc., Phila., Pa.
National Saw Co., Newark, N. J.
Simonds Mfg. Co., Fitchburg, Mass.

Saw Clamps
Disston, Henry & Sons, Inc., Phila., Pa.

Saw Guides
Thomson Bros. & Co., Lowell, Mass.

Saw Handles
Ladd, W. C., Bristol, Conn.

Saw Sets
Disston, Henry & Sons, Inc., Phila., Pa.
Taintor Mfg. Co., 9 to 15 Murray, N. Y.

Saw Tools
Atkins, E. C. & Co., Indianapolis, Ind.

Scales
American Cutlery Co., Chicago, Ill.
Chattillon, John & Sons., 55-59 Cliff, N. Y.
Chicago Scale Co., Chicago, Ill.
Pelouse Scale & Mfg. Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh.

Scrap Metals
Armstrong, R. S. & Bro., Atlanta, Ga.
Atlanta Junk Co., Atlanta, Ga.
Blake, M. J. & M., 14th Ave. and 15th St., N. Y.

Scrapers, Road
American Steel Scraper Co., Sidney, O.
Aultman Co., Canton, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Snyder Steel Scraper Co., Sidney, O.
Syracuse Chilled Plow Co., Syracuse, N. Y.

Screens, Perforated Metal
Harrington & King Perforating Co., Chicago, Ill.

Screens, Window and Door
Darby, Edw. & Sons, Philadelphia, Pa.

Screw Cutting Dies
Card, S. W. Mfg. Co., Mansfield, Mass.
Geometric Drill Co., Westville, Conn.
Rogers, Jno. M. Boat Gauge & Drill Wks., Gloucester City, N. J.

Screw Drivers
Braunsdorf-Mueller Co., Elizabeth, N. J.
Brown, R. H. & Co., New Haven, Conn.
Goodell-Pratt Co., Greenfield, Mass.
Mayhew, H. H. Co., Shelburne Falls, Mass.

Screw Machine Products
Dodge Machine Screw Co., Boston, Mass.

Screw Machinery
American Tool Wks. Co., Cincinnati, O.
Brown & Sharpe Mfg. Co., Providence.
Costello, J. E. Mch. Wks., Brooklyn, N. Y.
Draper Mach. Tool Co., Worcester, Mass.
Garvin Machine Co., Spring and Varick Sts., N. Y.

Screws
Coach
Hall & Sam'l Sons, 223 West 10th St., N. Y.
Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.

Screws
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Chicago Screw Co., Chicago, Ill.
Haskell, Wm. H. Mfg. Co., Pawtucket.
Hubbell, Harvey, Bridgeport, Conn.
Illinois Screw Co., Chicago, Ill.
Miles, P. S., 305 Quarry, Philadelphia.
New Britain Hdw. Mfg. Co., New Brit., Conn.

Screws
Nixara Screw Co., Buffalo, N. Y.
Phila. Mach. Screw Works, Phila., Pa.
Pittsburgh Screw & Bolt Co., Pittsburgh, Pa.

Screws
Reel & Curtis Mch. Screw Co., Worcester, Mass.
Rhode Island Tool Co., Providence, R. I.
Worcester Mch. Screw Co., Worcester.

Screws
American Screw Co., Providence, R. I.
Franklin Moore Co., Winsted, Conn.
Reading Hardware Co., Reading, Pa.
Reading Screw Co., Norristown, Pa.

Screw Saws
Barnes, W. F. & John Co., Rockford, Ill.
Millers Falls Co., 25 Warren St., N. Y.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Seythe Stones and Whetstones
Cleveland Stone Co., Cleveland, O.
Pike Mfg. Co., Pike Station, N. H.

Seamless Steel Tubes
Ivins Ellwood, 487 Broadway, N. Y.
Janney, Stelmutz & Co., Phila., Pa.
National Tube Co., Pittsburgh, Pa.

Security Snaps
Sundries Mfg. Co., South Bend, Ind.

Set Screw Protectors
Canfield, H. O., Bridgeport, Conn.

Sewing Machines
Demorest Mfg. Co., Williamsport, Pa.
National Sewing Machine Co., Belvidere, Ill.

Shafting
Cresson, Geo. V. Co., Philadelphia, Pa.
Dodge Mfg. Co., Mishawaka, Ind.
Fairmont Mch. Co., Philadelphia, Pa.
Finished Steel Co., Youngstown, O.
Jones & Laughlins Co., Pittsburgh, Pa.
Pardee & Sons, Perth Amboy, N. J.
Pittsburgh Steel Shafting Co., Rankin, Pa.

Shapers
Barker-Charl Mach. Tool Co., Cincinnati, O.
Gould & Eberhardt, Newark, N. J.
Potter & Johnston Co., Pawtucket, R. I.

Shear Knives
Pittsburgh Shear, Knife & Machine Co., Pittsburgh, Pa.
Trethewey, Sam'l & Co., Ltd., Pittsburgh

Shears and Scissors
Acme Shear Co., Bridgeport, Conn.
Bridgeport Mfg. Co., Bridgeport, Conn.
Cattaraugus Cutlery Co., Little Valley, N. Y.
Heinrich, R. Sons Co., Newark, N. J.
Lane Cutlery Works, Cedar Rapids, Ia.
National Cutlery Co., Phila., Pa.
Wiebusch & Hilger, Ltd., 9-15 Murray St., N. Y.

Shears, Metal
Carlin's, Thomas Sons Co., Allegheny, Pa.

Sheet Bars
National Steel Co., Battery Park Building, N. Y.

Sheet and Bolt Copper
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Sheet and Rolled Brass
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Sheet Metal Machinery
Adriance Mach. Works, Brooklyn, N. Y.

Sheets, Galvanized
American Sheet Steel Co., New York.
McCullough Iron Co., Wilmington, Del.

Sheets, Iron and Steel
American Sheet Steel Co., New York.
McCullough Iron Co., Wilmington, Del.
National Steel Co., Bridgeport, O.
Singer, Nimick & Co., Inc., Pittsburgh.
Wister, L. & R. Co., Philadelphia, Pa.
Alan Wood Co., Philadelphia.

Sheet Zinc
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.

Shelf Boxes
Heller Box Co., Montclair, N. J.
Moore, C. P., Havenswood, W. Va.

Shelf Ladders
McCullough Ladder Co., Chicago, Ill.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.

Shelving
Warrin, J. D. Mfg. Co., Chicago, Ill.

Shipbuilders
Newport News Shipbuilding & Dry Dock Co., 1 Broadway, N. Y.

Shovels, Spades and Scoops
St. Louis Shovel Co., St. Louis, Mo.

Sidewalk Cleaners
Hiles, C. A. & Co., Chicago.

Sinks
Kilbourne & Jacobs Mfg. Co., Columbus, O.

Skates, Ice
Avery Stamping Co., Cleveland, O.
Dame, Stoddard & Co., Boston, Mass.
Union Hardware Co., Torrington, Conn.

Skate Sharpeners
Osborn Mfg. Co., Cleveland, O.

Skylights
Drouve G. Co., Bridgeport, Conn.

Smelting Works
Reeves, Paul S., 760 S. Broad, Phila.

Soapstone Goods
Pike Mfg. Co., Pike Station, N. H.

Soapstone Pencils
Steward, D. M. Mfg. Co., Chattanooga, Tenn.

Soldering Copper Handles
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Soldering Coppers
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Speaking Tubes
Strander, W. R. & Co., 204 Fulton St., N. Y.

Specialty Manufacturers
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Smith & Edge Mfg. Co., Bridgeport, Ct.

Spelter
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.

Spelter Solder
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Spikes
American Iron & Steel Mfg. Co., Lebanon, Pa.

Spoons and Forks
International Silver Co., Meriden, Ct.

Sporting Goods
Dame, Stoddard & Co., Boston, Mass.

Spray Pumps—(See Pumps)

Spring
American Steel & Wire Co., Chicago, Ill.
Barnes, Wallace Co., Bristol, Conn.
Cary Spring Works, 240 W. 25th St., N. Y.
Chadillon, John & Sons, 85-89 Cliff St., New York.

Spring
Clark & Cowles, Plainville, Conn.
Cleveland Wire Spinning Co., Cleveland, O.
Dunbar Bros., Bristol, Conn.
Gibson, W. D. Co., Chicago.

Spring
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Sabin Machine Co., Montpelier, Vt.
Scott, Chas. Spring Co., Phila., Pa.
Tuck Mfg. Co., Brockton, Mass.
Welch, T. F. Mfg. Co., Boston, Mass.

Spring
Wurster, F. W. & Co., Brooklyn, N. Y.

Spring Cutters
Brooks, M. S. & Sons, Chester, Conn.
Holinger Fence Co., Greenville, O.

Spring Hinges
Bommer Bros., Brooklyn, N. Y.
Van Wagoner & Williams Hdw. Co., Cleveland, O.

Sprocket Chain
Buhl Malleable Co., Detroit, Mich.

Spur Cutters, Foot and Power
Shuster, F. B. Co., New Haven, Conn.

Stacks
Scaff, Wm. B. & Sons, Pittsburgh.

Stamped Ware
Jenkinson, R. C. & Co., Newark, N. J.
Keen & Hagerty, Mfg. Co., Baltimore.
New York Stamping Co., Brooklyn, N. Y.

Stamping, Sheet Metal
American Railway Supply Co., 24 Park Place, N. Y.

Steel
American Steel Scraper Co., Sidney, O.
Cleveland Stamping & Tool Co., Cleveland, Ohio.
Davis & Duxton Stamping Co., Worcester, Mass.

Steel
Goodwin & Kins Co., Winsted, Conn.
Houghton & Buxton Mfg. Co., Worcester, Mass.

Steel
Jenkinson, R. C. & Co., Newark, N. J.
Kingslow, E. & Bro., Cleveland, Ohio.
McKeena Bros. Brass Co., Ltd., Pittsburgh, Pa.

Steel
Mossberg, Frank Co., Attleboro, Mass.
Reed & Curtis Mch. Screw Co., Worcester, Mass.

Steel
Seamless Steel Ware Co., 277 Broadway, N. Y.

Steel
Wheeling Hinge Co., Wheeling, W. Va.
Wilson & Smith, Worcester, Mass.

Steel
Shuster, F. B. Co., New Haven, Conn.

Steel
Staples and Double Pointed Tacks
Grand Crossing Tack Co., Grand Crossing, Ill.

Steel
Milwaukee Tack Co., Milwaukee, Wis.
Titchener, E. H. & Co., Binghamton, N. Y.

Steel
Stream Hammers
Dienelt & Eisenhardt, Philadelphia.

Steel
Dudgeon, Richard, 24 Columbia St., N. Y.
Pittsburgh, Pa.

Steel
Sellers, H. & Co., Inc., Phila., Pa.

Steel
Steam Heating
Wensler, Warren & Co., Camden, N. J.

Steel
Steam Separators
Harrison Safety Boiler Wks., Phila., Pa.
Webster, Warren & Co., Camden.

Steel
Steam Shovels
The Automatic Shovel Co., Lorain, O.

Steel
Steam Specialties
Crosby Steam Gauge & Valve Co., Boston.
Mason Regulator Co., Boston, Mass.

Steel
Steel Buildings
American Bridge Co., East Berlin, Ct.
Boston Bridge Works, Boston, Mass.
New England Structural Co., Boston, Mass.

Steel
Ritter-Conley Mfg. Co., Pittsburgh, Pa.
Scaff, Wm. B. & Sons, Pittsburgh, Pa.

Steel
Steel Chimneys
Lindsay, W. W. & Co., Phila., Pa.

Steel
Steel, Cold Rolled Strip
Wilder & Hobbs Mfg. Co., Bridgeport.

Steel
Wolf, R. H. & Co., Ltd., 111th Street and Harlem River, N. Y.

Steel
Steel Flanges, Weldless
Latrobe Steel Co., Philadelphia, Pa.

Steel
Steel Forgings and Castings
Bethlehem Steel Co., So. Bethlehem, Pa.

Steel
Steel Hoops
American Steel Hoop Co., Battery Park Building, N. Y.

Steel
Steel Importers
Hobson, Houghton & Co., 98 John St., N. Y.

Steel
Steel, Wm. & Sons, Sheffield, England, or 91 John St., N. Y.

Steel
Milne, A. & Co., 1 Broadway, N. Y.

Steel
Wheelock, Lovejoy & Co., New York and Boston.

Steel
Steel (Mushet's Special)
Jones, R. M. & Co., Boston.

Steel
Steel Manufacturers
American Steel Hoop Co., Battery Park Building, N. Y.

Steel
American Steel & Wire Co., Chicago, Ill.
Baker, Hermann & Co., 103 Duane St., New York.

Steel
Braeburn Steel Co., Braeburn, Pa.
Canton Steel Co., Canton, Ohio.
Champion Iron & Steel Co., Muskegon, Mich.

Steel
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Frankford Steel Co., Philadelphia.

Steel
Hobson, Houghton & Co., 98 John St., N. Y.

Steel
Jesop, Wm. & Sons, Sheffield, England, or 91 John St., New York.

Steel
Jones & Laughlins, Ltd., Pittsburgh, Pa.
Kidd Bros. & Wurgner Steel Wire Co., McKees Rocks, Pa.

Steel
La Belle Steel Co., Pittsburgh, Pa.
Lorain Steel Co., Lorain, Ohio.

Lakens Iron & Steel Co., Coatesville, Pa.
Nash, Geo. & Co., Chicago.
National Steel Co., Battery Park Building, N. Y.
Newkirk, J. B. & Co., Philadelphia, Pa.
Otis Steel Co., Ltd., Cleveland, Ohio.
Republic Iron & Steel Co., Chicago, Ill.
Rowland, Wm. & Harvey, Frankford, Philadelphia.
Singer, Nimick & Co., Inc., Pittsburgh.
Wardlaw, S. & Co., Sheffield, England.
Wilmot & Hobbs Mfg. Co., Bridgeport.
Manufacturers' Agents
Ogden & Wallace, 377-383 Greenwich St., New York.
Snyder, W. P. & Co., Pittsburgh, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Virginia Iron, Coal and Coke Co., Bristol, Va.—Tenn.

Steel, Self Hardening
Denman & Davis, 85-87 John St., N. Y.

Steel Rails
Lorain Steel Co., Lorain, Ohio.

Steel Stamps and Stencil Dies
Kacker, L. A. Stamp Wks., Little Ferry, N. J.
Ness, Geo. M., Jr., 61 Fulton St., N. Y.
Schwerdtle & Siebert, Bridgeport, Conn.

Steel, Tool
Braceburn Steel Co., Braceburn, Pa.
Canston Steel Co., Canton, Ohio.
Crescent Steel Co., Pittsburgh, Pa.
Denman & Davis, 85-87 John St., N. Y.
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, England, 91 John St., N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
Nash, Geo. & Co., Chicago.
Singer, Nimick & Co., Pittsburgh, Pa.

Step Ladders, Rolling
Bicycle Step Ladder Co., Chicago, Ill.
Roburn Trolley Track Mfg. Co., Holbrook, Mass.
Milbradt, G. A. & Co., St. Louis, Mo.
Morley Bros., Saginaw, Mich.

Sticks and Dies
Card, S. W. Mfg. Co., Mansfield, Mass.
Curtis & Curtis, Bridgeport, Conn.
Hollands Mfg. Co., Erie, Pa.
Jones & Lamson Mch. Co., Springfield, Vt.
Jarecki Mfg. Co., Erie, Pa.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield.
Winter Bros., Wrentham, Mass.

Stone Cutting Machinery
Gilmour, J. Bennett Bldg., N. Y.

Stone Working Machinery
Patch, F. H. Mfg. Co., Rutland, Vt.

Stop Screws
Head, A. P. & Co., Chicago, Ill.

Store Fixtures
Warren, J. M. Mfg. Co., Chicago, Ill.

Storm Window Fasteners
Woodruff, W. W. & Sons, Mt. Carmel, Ct.

Stove Linings
Strander Fire Brick Co., Troy, N. Y.

Stove Pipe Thimbles
Cheney, S. & Son, Manlius, N. Y.

Stove Trucks
Crade Mfg. Co., Freeport, Ill.

Stoves, Oil, Vapor and Gasoline
Novelty Mfg. Co., Jackson, Mich.
Schneider & Trenkamp Co., Cleveland, Ohio.

Straightening Machines, Wire and Sheet Metal
Shuster, F. B. Co., New Haven, Conn.

Structural Iron and Steel Work
American Bridge Co., East Berlin, Ct.
Boston Bridge Works, Boston, Mass.
Du Bois Iron Works, Du Bois, Pa.
Eastern Bridge & Structural Co., Worcester, Mass.
Forest City Steel & Iron Co., Cleveland, Ohio.
Illinois Steel Co., Chicago, Ill.
Moseley Iron Bridge & Roof Co., 39 Cortlandt St., N. Y.
New England Structural Co., Boston, Mass.
Phoenix Iron Co., Philadelphia, Pa.
Ritter-Conley Mfg. Co., Pittsburgh, Pa.
Stewart Iron Works, Cincinnati, Ohio.
West Side Foundry Co., Troy, N. Y.

Sulphuric Acid
Mathiasen & Hejeler Zinc Co., La Salle, Ill.

Swaging Machine
Excelsior Needle Co., Torrington, Ct.

Table Ware
International Silver Co., Meriden, Ct.

Tacks, Brads, &c.
Diamond Tack & Nail Works, Raynham, Mass.
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Milwaukee Tack Co., Milwaukee, Wis.
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Ripley & Bartlett, Plymouth, Mass.
Shilton Co., Birmingham, Conn.

Tack and Nail Machinery
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Tanks, Iron and Steel
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Wm. B. & Sons, Pittsburgh.

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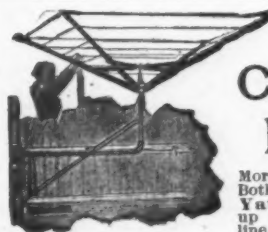
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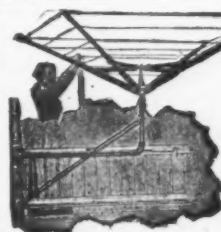
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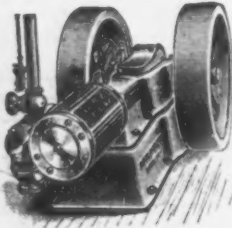
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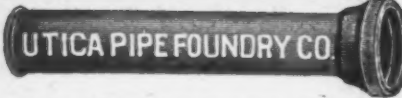
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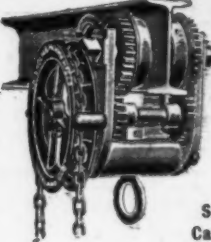
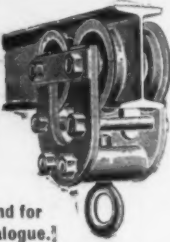
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